JOURNAL
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AMERICAN VETERINARY MEDICAL ASSOCIATION

GENERAL ARTICLES

Caseous Lymphadenitis of Sheep—*Keith T. Maddy* 257
A Large and Small Animal Hospital—*Charles A. Thompson* 260
The Veterinary Medical Profession in the Americas—Its Size and Distribution—*Benjamin D. Blood* 266
The Armed Forces Institute of Pathology and Its Relation to Veterinary Medicine—*Chester A. Gleiser* 269

SURGERY AND OBSTETRICS

Cesarean Section in Ewes—*William F. Riley, Jr.* 272
Schlatter's Disease in a Pup—*E. F. Thomas* 275
Infertility in Cattle—A Review—*Durward Olds* 276
The Treatment of Certain Types of Sterility in Cattle with the Hormone, ECP[28]—*H. Lincoln Easterbrooks and W. N. Plastridge* 287
Methadone, Scopolamine, and Nembutal Anesthesia in 15 Dogs—*H. C. Hall* .. 289
Traumatic Reticulitis—*A. G. Hansen* 290

CLINICAL DATA

Sporadic Bovine Encephalomyelitis—*Menges—Harshfield—Wenner* 294
"Flying Saucerosis" in a Calf—*Hilton A. Smith* 299
A Preliminary Report on the Isolation and Identification of the Bluetongue Virus from Sheep in California—*McKercher—McGowan—Howarth—Saito* 300
The Use of Dead Strain 19 Vaccine to Differentiate Vaccinal from Infection Titers of Brucellosis (*Abortus*) in Cows—*Barner—Oberst—Atkeson* .. 302
Anthrax—Response to Terramycin Therapy—*William W. Bailey* 305
Terramycin in the Treatment of *Salmonella California* Infection in Turkeys—*Mackel—Galton—Cowdery—Hardy* 306
The Use of a Cholinesterase Inhibitor in Neuromuscular Dysfunctions of the Horse—*George F. Badame* 307
The Effect of Isonicotinic Acid Hydrazide on *Mycobacterium Paratuberculosis*—*Aubrey B. Larsen and T. H. Vardaman* 309
Orchitis and Varicocele of an Undescended Testicle—*E. Irvin Neserke* 310
Preliminary Observations on the Use of Certain Nitrofuran Compounds in the Control of Enterohepatitis (Blackhead) in Turkeys—*J. K. McGregor* .. 312
Sulfisoxazole—Some Aspects of Its Pharmacology—*C. M. Stowe* 315

EDITORIAL

That Cholera Vaccinating Conundrum Again 320

NEWS FROM WASHINGTON 330

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CONTENTS

(Continued from Cover)

SURGERY AND OBSTETRICS

Cesarean Section in the Ewe 273
Efficacy of Estradiol Cyclopentyl-Propionate (ECP) in Anestrus Ewes 274
Injuries to the Stifle Joint in Dogs 275
Chilling and Overheating Chicks 288
Artificial Breeding in Turkeys 293
Enterotomy in a Pony 293
Prolapsed Rectum in a Dog 293
Effect of Progesterone on Time of Ovulation of Heifers 293

CLINICAL DATA

Clinical Report on Bluetongue 301
Associated Serum Producers Sponsor Essay Contest 304
A Correction—Mr. Chinniah Not a Veterinarian 304
Rabies in St. Louis 311
Pathogenesis of Rabies 311
Infectious Bronchitis in Chickens 314
Death from Psittacosis 314
Correction 314
Immunizing Dogs for Leptospira 318
Scrapie Denied in Australia 318

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CONTENTS—Continued

Nutrition

Urea—Feed with Care 319
Where to Put the Salt 319
Synthetic Milk for Pigs 319
New Hematonic for Baby Pigs 319
Folic Acid Deficiency in Lambs 319

Current Literature

Abstracts

Effect of Viomycin and Other Agents on Mycobacterium Paratuberculosis, *324*; Froth Formation, *324*; Canine Penicillin Blood Levels Obtained with Parenteral Benzethacil, *324*; Hemolytic Icterus of Newborn Foals, *324*; Chemotherapy of Enterohepatitis of Turkeys, *324*; Corpus Luteum Ablation and Progesterone Replacement Therapy During Pregnancy in the Cow, *324*; Preputial Samples for Diagnosis of Trichomoniasis in Bulls, *325*; Pseudorabies Virus (Aujeszky Strain) in the Rhesus Monkey, *325*; Dramamine and the Vestibular Apparatus in the Dog, *325*; Evaluation of Acid-Fast Allergens on Sensitized Goats, *325*.

Foreign Abstracts

Demodectic Mange, *325*; Anesthesia with Sodium Pentobarbital, *326*; Lumbar Epidural Anesthesia, *326*.

Books and Reports

Veterinary Clinical Pathology, *326*; Aids to Zoology, *326*; Annual Review of Microbiology, *327*; The Pharmacology of Anesthetic Drugs, *327*; Soviet Virology, *327*.

The News

Section Programs Complete for Toronto Meeting 328
First Lieutenancy Bills Referred to Department of Defense 330
Board of Governors Meets Secretary Benson and Confers with Government Officials 330
Washington Office Established 330
AVMA Research Fund Continues to Grow 331
General McCallam Retires as Head of Veterinary Corps 331
Veterinarians Participate in First Inter-American Congress of Public Health 332
The A.A.H.A. Annual Meeting To Be Held in Minneapolis 333
Dr. Riser Chosen Veterinarian of the Year 333
Dr. Holm Appointed Dean of Agricultural College 333
Student Chapter Activities 333
Women's Auxiliary 334
Applications 335
U. S. Government 336
Among the States and Provinces 337
Births 344
Deaths 344

Miscellaneous

Johne's Disease Vaccination, *265*; The Hide Problem, *265*; Virus Diseases in Public Health, *265*; Toxicity of Red Squill, *265*; Liver Abscesses and Gastritis, *268*; A Mule-Footed Cattle Problem, *271*; Pentachlorophenol Not Poisonous, *293*; Vesicular Exanthema Controls to Be Stepped Up, *323*; Scrapie Reported in Three States, *323*; More Twin Calves for Experiments, *323*.

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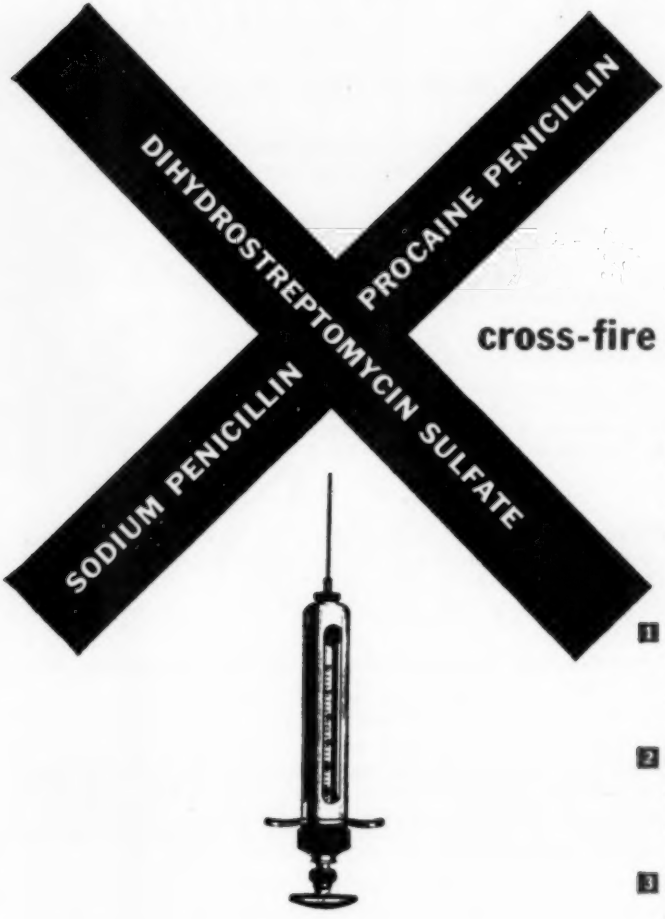

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AVMA ☆ Report

Veterinary Medical Activities

✦ President W. L. Boyd attended the dedication of Giltner Hall, the new unit of the School of Veterinary Medicine at Michigan State College, in East Lansing, on March 24.

* * *

✦ President-Elect J. A. McCallam represented the Association at the National Conference on World Health held in Washington, D. C., April 6-8.

* * *

✦ Executive Secretary Hardenbergh attended ceremonies at Ontario Veterinary College on March 20 during which a portrait of Dr. F. W. Schofield, long-time faculty member and professor of pathology, was presented to the college. In the evening, he spoke at the annual banquet of the O.V.C. Student Chapter.

* * *

✦ Editor-in-Chief Aitken was on the program of the Michiana V.M.A. meeting in South Bend on the evening of March 12. He also participated in a livestock conservation conference at Sioux Falls, S. Dak., on April 10.

* * *

✦ For details of the Board of Governors meeting held in Washington, D.C. February 26-28, *see* p. 330.

* * *

✦ Assistant Executive Secretary Van Houweling attended the following meetings during March: The public relations committee of the Michigan State V.M.A. in East Lansing on the 4th; the committee on local arrangements for the 1953 Convention in Toronto on the 10th, and the annual meeting of the National Health Council in New York City, on the 18th to the 20th.

* * *

✦ Invitations to present scientific or educational exhibits at the 1953 AVMA convention have been sent to schools of veterinary medicine, departments of veterinary science and pathology, and other institutions and agencies.

* * *

✦ Veterinarians appointed by the Secretary of Agriculture to the advisory committee on vesicular exanthema are former Congressman (Dr.) Geo. W. Gillie of Indiana, Dr. Ralph Hendershott of New Jersey representing the U. S. Livestock Sanitary Association, Dr. H. E. Kingman, Jr., of Chicago, representing the American Meat Institute, and Dr. C. D. Van Houweling representing the AVMA.

* * *

✦ The scientific program for the 90th AVMA Annual Meeting is complete and will consist of forty-two hours of sectional meetings. In addition to the papers presented, there will be about six hours of closed circuit television and many movies (*see* p. 328 for more program information).

* * *

✦ At the last annual meeting of Livestock Conservation Inc., in Chicago on February 28, Assistant Executive Secretary Van Houweling was elected to the executive committee of that organization.

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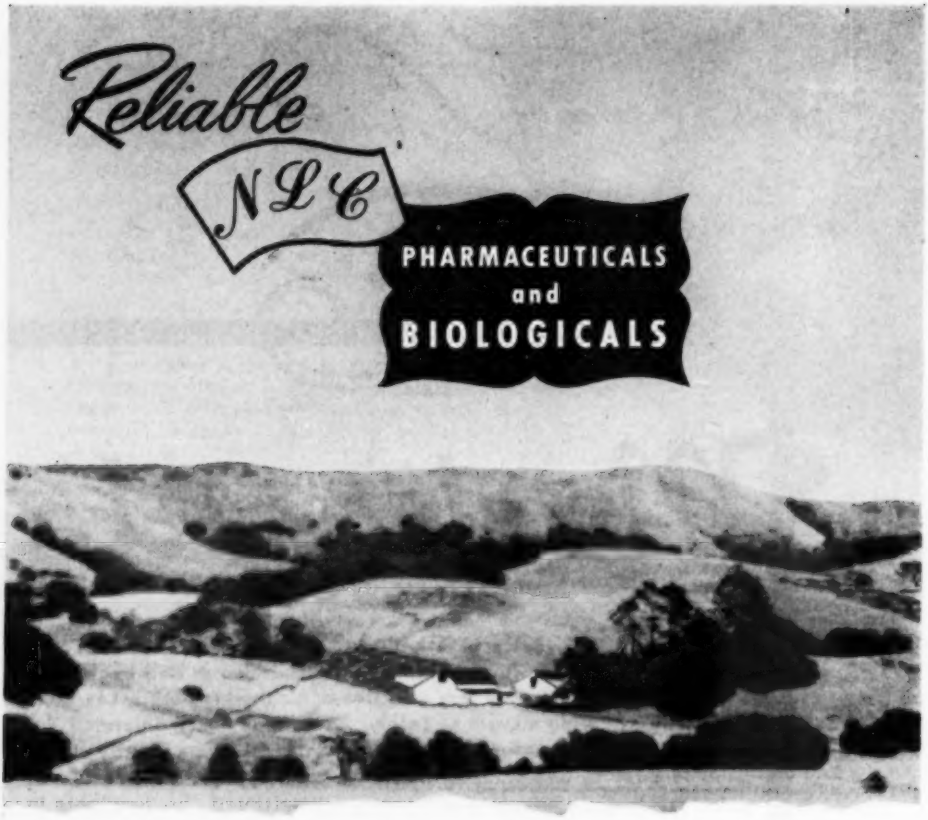

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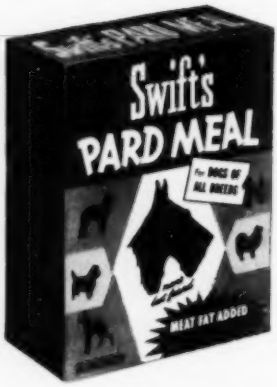

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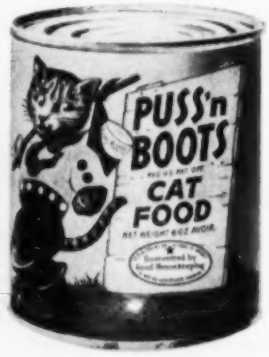

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1. Scott, M. L. Notes on a Successful Effort to Treat Horses Which Bleed, The Blood Horse, LXIV:1008 (Nov.) 1952.
2. Blamey, E. R. Coagulation in Seeping Hemorrhage – Evaluation of Koagamin, J. Am. Vet. M. A. 119:291, 1951.
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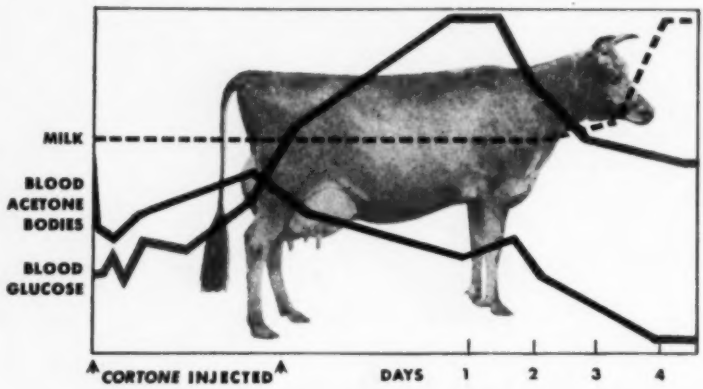

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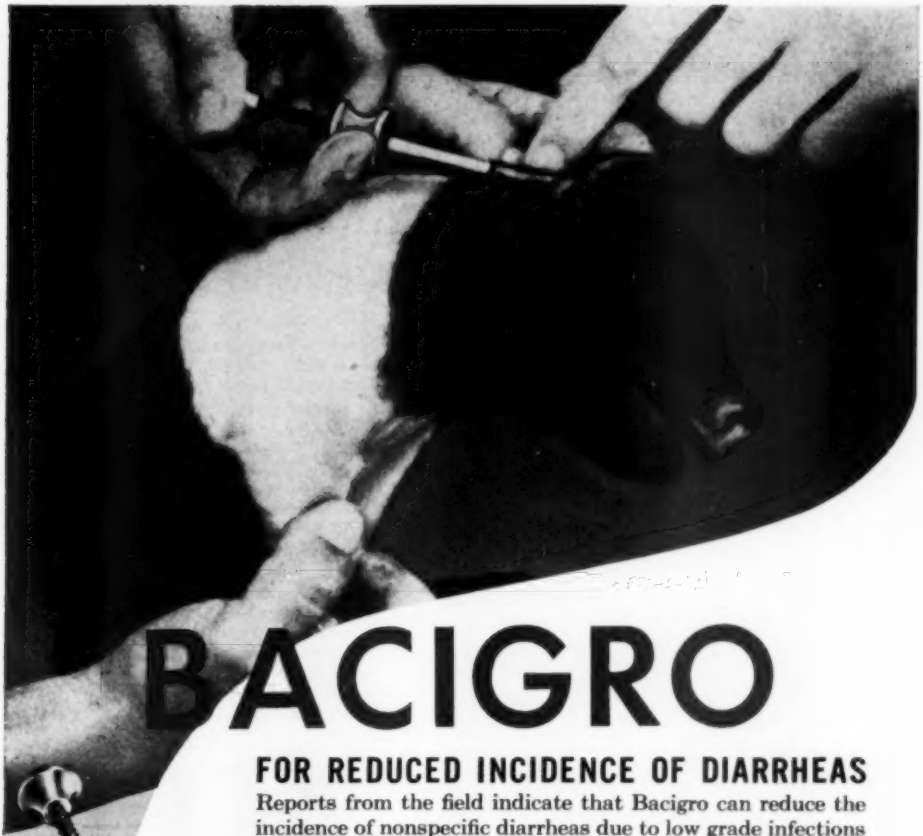

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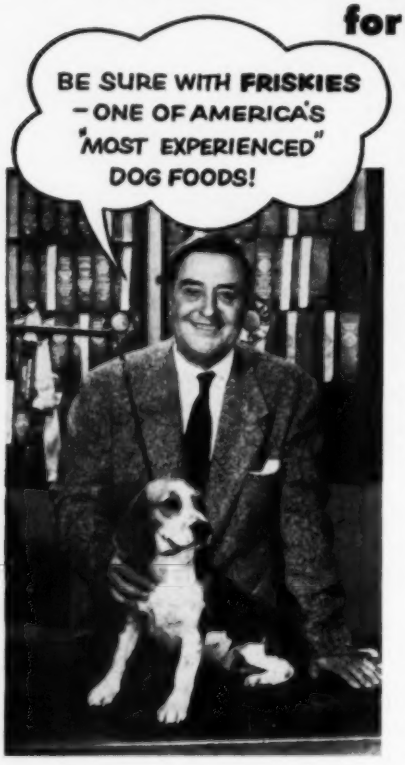

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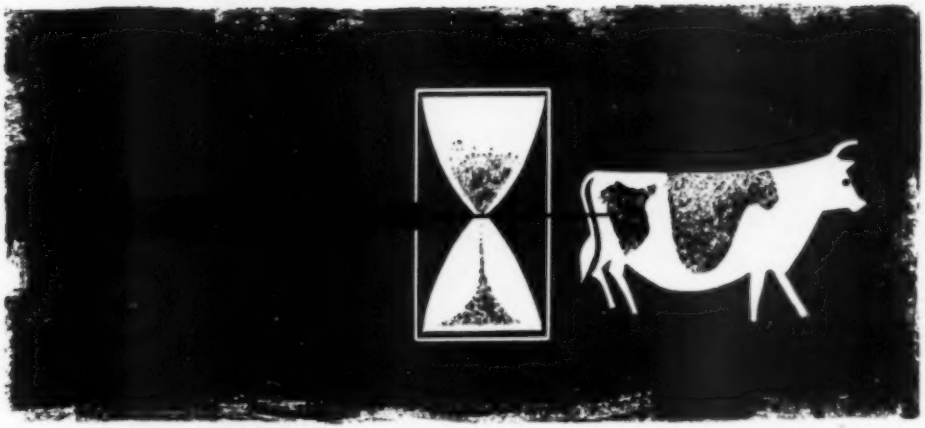

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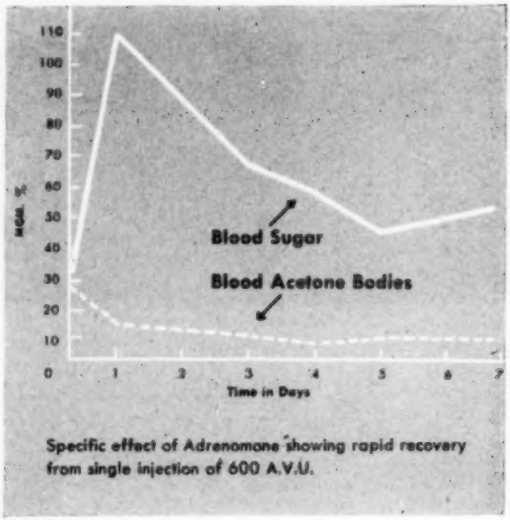

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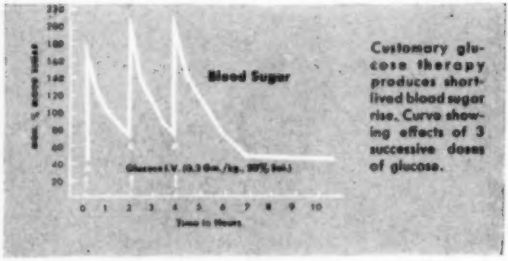

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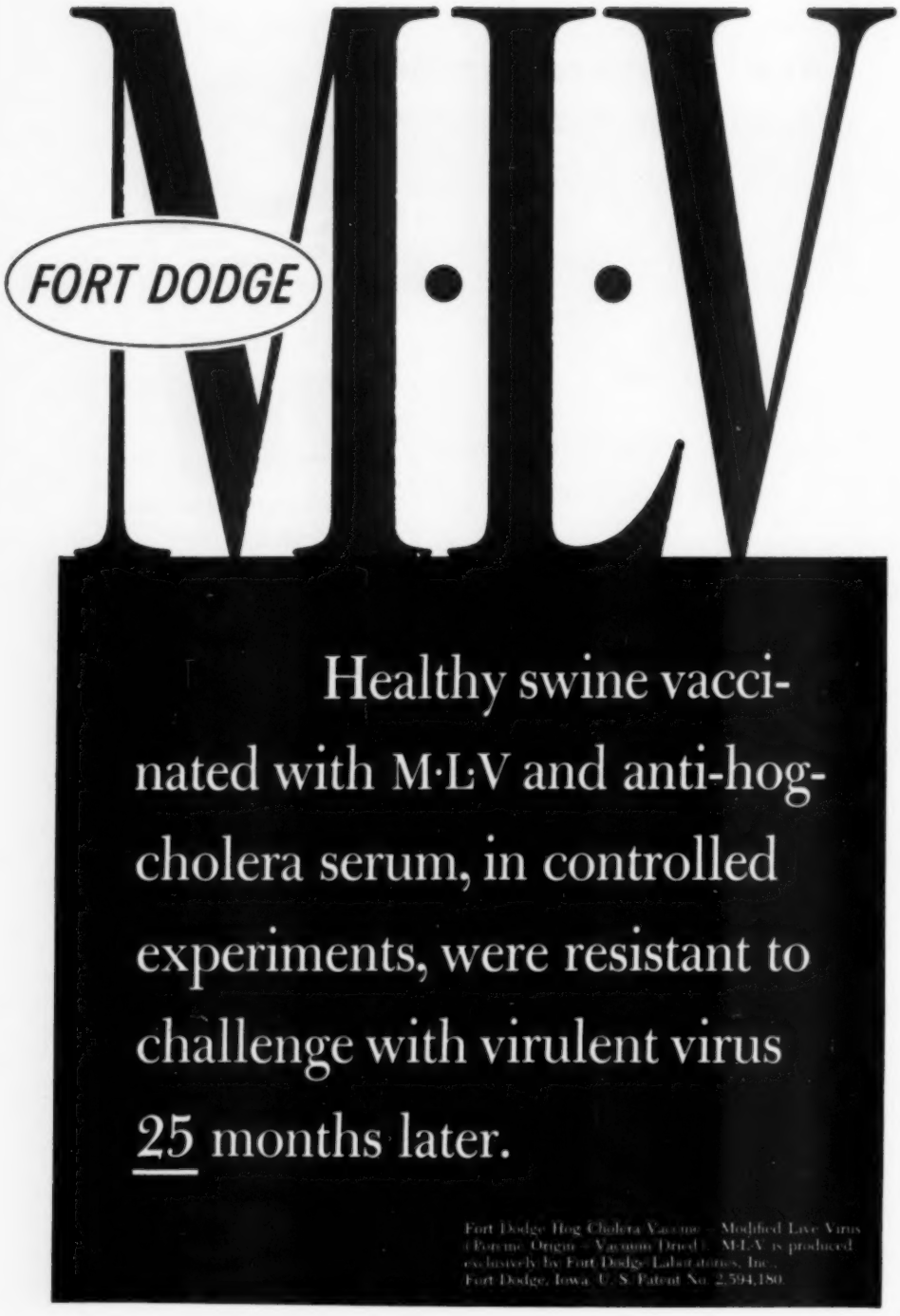
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Caseous Lymphadenitis of Sheep

KEITH T. MADDY, D.V.M.

Los Angeles, California

CASEOUS lymphadenitis (pseudotuberculosis) of sheep is a chronic disease characterized by caseation necrosis primarily of the lymph nodes and secondarily by generalized infection sometimes resulting in emaciation, cachexia, and death.

During the fiscal year of 1952, 11,205,149 sheep were inspected postmortem by veterinary inspectors of the Meat Inspection Service, U. S. Bureau of Animal Industry. This represented about 90 per cent of the commercial sheep slaughter for that year in the United States. Of these sheep, 68,965 were condemned on postmortem inspection; 12,056 were condemned because of caseous lymphadenitis. On a national basis, this disease was third in importance. (The No. 2 cause of condemnation was pleuritis and pneumonia, with 16,669 condemnations; the No. 1 cause was emaciation, with 23,699 condemnations.)[4] In sheep from western United States, caseous lymphadenitis is often the first cause for condemnation. For every sheep condemned for caseous lymphadenitis, there are at least 10 others which show gross lesions but are passed for cooking or are passed without restriction after removal of lymph nodes and other infected parts. It can be seen that the disease is an important one in this country, but it certainly does not receive adequate attention. The author, as a veterinary meat inspector at the various meat packing houses in Los Angeles for four years, has seen several thousand cases of the disease.

Etiology and Distribution.—The disease is caused by the bacterium *Corynebacterium pseudotuberculosis* (*Corynebacterium ovis*). It is prevalent in Australia, New Zealand, Argentina, Uruguay, Chile, South Africa, and in western United States.[2,3] It is present in Europe but is kept out of England by careful import inspection.[2]

Other Diseases Caused by Same Organism.—This bacterium also causes caseous lymphadenitis of goats and deer, both in the United States and elsewhere.[2,3] Ulcerative lymphangitis of the horse is caused by this organism; it occurs in Europe but is rare in the United States.[2,3] Some suppurative conditions of cattle and some of the so-called skin lesions of tuberculosis are caused by *C. pseudotuberculosis*.[3]

Epizoötiology.—The disease is seen primarily in old sheep, but the author has seen gross lesions in lambs as young as 4 months of age—this is rare, however. Both sexes are affected. Animals in good condition acquire the infection as well as those which are thin. Animals may acquire the infection by ingestion or inhalation of the organism, but the usual mode of infection is via skin wounds. Hutyra, Marek, and Manninger[2] report it may follow castration, tail docking, ear cutting, and tagging, but the infection is most commonly introduced through cuts in the skin following shearing. The organism is passed out in the feces and remains viable for several months even though frozen. It is soon killed by sunlight, by heating at 58 C. for ten minutes.

Dr. Maddy was veterinary meat inspector for the U. S. Bureau of Animal Industry in Los Angeles, Calif., at the time this work was done. He is now on military furlough from the BAI and is base veterinarian, Oakland Army Base, Oakland, Calif.

or by the usual disinfectants such as are used in tuberculosis eradication programs.

Several sheep owners of central California who make a practice of observing postmortem inspection of their flocks to better understand their disease problems have reported to the author that they have reduced the incidence of infection of their sheep, as evidenced by the gross lesions seen on postmortem, by moving the flocks around as much as possible and avoiding the use of permanent feedlots and shelters. By doing this, they report that not only are there fewer lesions seen on postmortem examinations of their sheep (about 80% reduced to 21% in one flock, about 90% reduced to 13% in another, and about 50% to 28% in a third flock), but also the ewes' useful reproductive lives are increased about three years. Fewer deaths of older sheep on the ranches were noted. No doubt part of this improved health was also due to reduction of parasitisms and other infections.

Humphreys and Gibbons have reported that female ticks (*Dermacentor albipictus*) may harbor the infective organism.[1]

Signs of Infection.—The signs of infection appear slowly and sheep may be affected for years before much appears to be wrong with them. Enlargement of the prescapular and/or prefemoral lymph nodes is one of the earliest diagnostic involvements. In the case of internal involvement, slowly progressive anemia and cachexia may be noted. Often the lungs are involved and the signs of chronic pneumonia are noted.

Pathology.—Although it has not been proved, it appears that *C. pseudotuberculosis* produces leukocidin which kills leukocytes. In attempting to surround and kill a focus of infection, large numbers of dead cells are deposited, producing a typical abscess characteristic of this infection. The small, new abscesses are of a pasty consistency while the large, older abscesses are dry and solid (sometimes they are a little bit sandy due to slight calcification). The color of the caseous processes is greenish yellow; there is no odor to them, and the cut surface shows a concentric lamellation. The characteristic lesion formed is considered a diagnostic feature of the disease both by gross and microscopic methods.

The lymph node closest to the area of wound infection is affected, and the bronchial and mediastinal lymph nodes are often affected secondarily. In the case of ingestion or inhalation of the infective organism, the bronchial and mediastinal lymph node lesions may be primary, with no other pulmonary or digestive tract lesions. The lesions may stay localized for long periods or they may gradually increase in size and metastasize to various parts of the body. In the case of lowered resistance of the animal, a chronic empyema may become acute and the animal dies due to toxemia, emaciation, and cachexia. The author has examined postmortem a number of sheep which have died after long transit under adverse conditions. The sheep appear to be able to live with a heavy chronic infection until exposed to extreme cold and poor care and then the infection overcomes the animals' defenses and death soon results.

In the author's experiences of postmortem examinations, the gross lesions are found in infected sheep as frequently as follows: bronchial lymph nodes, 89 per cent; mediastinal lymph nodes, 81 per cent; lungs, 76 per cent; prescapular lymph nodes, 24 per cent; prefemoral lymph nodes, 15 per cent; hepatic lymph nodes, 14 per cent; liver, 12 per cent; superficial inguinal or supramammary lymph nodes, 9 per cent; castrated scrotum, 8 per cent; mammary gland, 6 per cent; kidney, 5 per cent; spleen, 4 per cent; muscle, 4 per cent; popliteal lymph nodes, 2 per cent; other lymph nodes and other tissues of the body are involved less than 1 per cent. No organ or tissue is immune. The author has seen lesions in the eye (2 cases), in the brain (3 cases), and in bones (2 cases of healed compound fractures of the femur).

The lesions vary in size from those barely visible up to as large as 12 in. in diameter in rare cases. An average abscess is about 1½ in. in diameter.

Diagnosis.—The lesions of the disease are so unique that they are considered almost always diagnostic of the condition upon gross examination. Tuberculosis is a rare disease of sheep; the lesions are a brighter yellow, not greenish, and are usually calcified and not as large. Coccidiomycosis of sheep is rare but the lesions are creamy yellow and quite small, in clusters, and are neither caseated or calcareous. Actinomycosis and actinobacillosis are not common infections of sheep and occur almost always only in the cervical area of sheep (this area is rarely involved in caseous lymphadenitis), and the abscesses

formed by these infections do not resemble caseous lymphadenitis. Necrobacillosis (infection with *Actinomyces necropherous*) of sheep produces abscesses which have a semiliquid consistency.

Microscopic examination of lesions of caseous lymphadenitis often reveals the typical lamellation which also can be seen in gross lesions.

A bacterial diagnosis made from smears from the lesions are not conclusive if Corynebacterium organisms are found, and the species is not determined because ovine pneumonia is caused by *Corynebacterium pyogenes*. It may be a secondary invader which may cause a fatal pneumonia in sheep which already have a *C. pseudotuberculosis* infection.

Prognosis.—Since the disease is chronic, if the infected animal is marketed early, loss will be minimized. Recovery or localization without subsequent flareups can not be expected.

Treatment.—Although there are antibiotics which are effective against the Corynebacterium organisms, the lesions caused by *C. pseudotuberculosis* are so encapsulated it is unlikely that one could expect the medicine to penetrate and kill all organisms except in a very slight infection. French and Australian research workers have tried antitoxins and toxoids as treatment and preventative agents with variable results. In the United States, the only biological products generally available to veterinarians, which have any effect against caseous lymphadenitis are mixed ovine bacterins. They are usually given to aid in preventing the infection complex of "shipping fever." They usually consist of *Pasteurella multocida, C. pseudotuberculosis*, and Salmonella sp. It is doubtful if this bacterin has much effect in preventing caseous lymphadenitis.

Meat Inspection.—The U.S.D.A. meat inspection regulations in regard to this disease are as follows:

> Caseous lymphadenitis; disposition of carcasses and parts. (*a*) A thin carcass showing well-marked lesions in the viscera and the skeletal lymph glands or such a carcass showing extensive lesions in any part shall be condemned. (*b*) A thin carcass showing well-marked lesions in the viscera with only slight lesions elsewhere or showing well-marked lesions in the skeletal lymph glands with only slight lesions elsewhere may be passed for cooking. (*c*) A thin carcass showing only slight lesions in the skeletal lymph glands and in the viscera may be passed without restriction. (*d*) A well-nourished carcass showing well-marked lesions in the viscera and with only slight lesions elsewhere or showing well-marked lesions confined to the skeletal lymph glands with only slight lesions elsewhere may be passed without restriction. (*e*) A well-nourished carcass showing well-marked lesions in the viscera and the skeletal lymph glands may be passed for cooking; but where the lesions in a well-nourished carcass are both numerous and extensive, it shall be condemned. (*f*) All affected organs and glands of carcasses passed without restriction or passed for cooking shall be removed and condemned. The term "thin" as used in this section shall not be held applicable to a carcass which is anemic or emaciated.[5]

Corynebacterium pseudotuberculosis is not considered pathogenic to man. The effect of the toxin present throughout the body of an infected sheep on man when he consumes the meat is not accurately known. Sheep extensively infected may become affected with a bacteremia or septicemia due to a secondary infection with various species of Salmonella or other organisms which are pathogenic to man. For these reasons, sheep extensively infected with caseous lymphadenitis should not be used for human food.

Summary.—Caseous lymphadenitis of sheep is discussed. It is an important disease of sheep in the United States and has not received adequate attention as to diagnosis or prevention on the farm and ranch.

Conclusions.—A good biological product should be developed to immunize sheep against this disease. More attention should be devoted to proper diagnosis of this condition on the farm and ranch, and it should be pointed out to sheep owners the loss the disease causes them.

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[4]U.S.D.A., Agric. Res. Admin., BAI, Meat Inspection Service: Summary of Activities—Fiscal Year 1952. Mimeographed by Meat Insp. Div., (1952): 1-5.

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A Large and Small Animal Hospital

CHARLES A. THOMPSON, D.V.M.

Dalhart, Texas

THE DALHART Animal Hospital, completed on June 1, 1952, is constructed of cement tile blocks with exterior stuccoed and dashed. A water-base paint was used on all interior walls except in the large animal and kennel room where a water-proof finish was applied for approximately 4 ft. from the floor. The floors were cemented with an asphalt tile laid in the office, hall, and bedroom. The small animal surgery and examination room has a terrazzo floor. Panel-ray, wall-type heaters keep the office, kennel, surgery, and examination room at a desirable temperature. An overhead (blower-type) heater is used to maintain desired temperature in the large animal room. A 3-ton air conditioner (Frigidaire) controls the temperature during the summer months.

The small animal surgery and examination room is separated by a cabinet with a double sink which is accessible to either side. Other built-in cabinets were installed for storage of drugs for large animal use, in order to prevent exposure to dust and to eliminate extra cleaning.

The cages in the kennel room are formed by concrete tile blocks, plastered and waterproofed. A steel frame, covered with expanded metal, was used for the top and front. A 5-ft. colored tub was installed in the adjacent bath and grooming room. Eight outside Mason fence runs complete the kennel layout.

A 6-ft., welded, steel, custom-made squeeze chute with adjacent lavatory provides sufficient equipment for handling cattle with minimum labor. Included in our large animal clinic are three box stalls with washed sand floors. Two outside corrals open into a chute leading into the squeeze chute in the large animal room, and an unloading dock conveniently adjoins the corrals. A 7-ft. solid fence encloses the corrals, dog runs, and activity in the back.

My hospital service is composed of approximately 80 per cent large animals and 20 per cent small animals. Since this is a range cattle country, our problems are those typical of any large animal practitioner. In the spring, most of our cases are obstetrical. Any animal requiring obstetrical surgery is brought to the hospital for treatment and confinement. Due to the severe cold weather, our box stalls in the large animal room furnish ideal quarters for the convalescent patient.

During the summer months, many cases of poisoning due to the change to green pastures and summer range conditions are encountered. During the fall and winter months, a large percentage of our cases are concerned with the shipping fever complex,

(*Continued on page 265.*)

Fig. 1—Front view of Dalhart Animal Hospital, Dalhart, Texas.

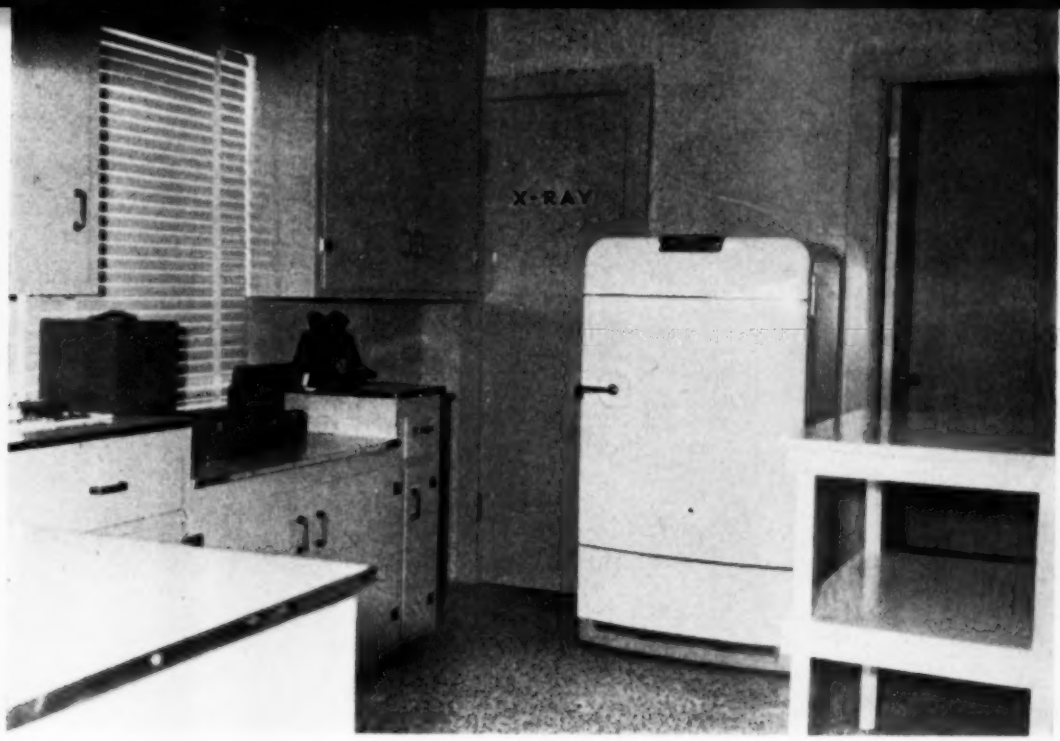

Fig. 2—Small animal examination room.

Fig. 3—Small animal surgery.

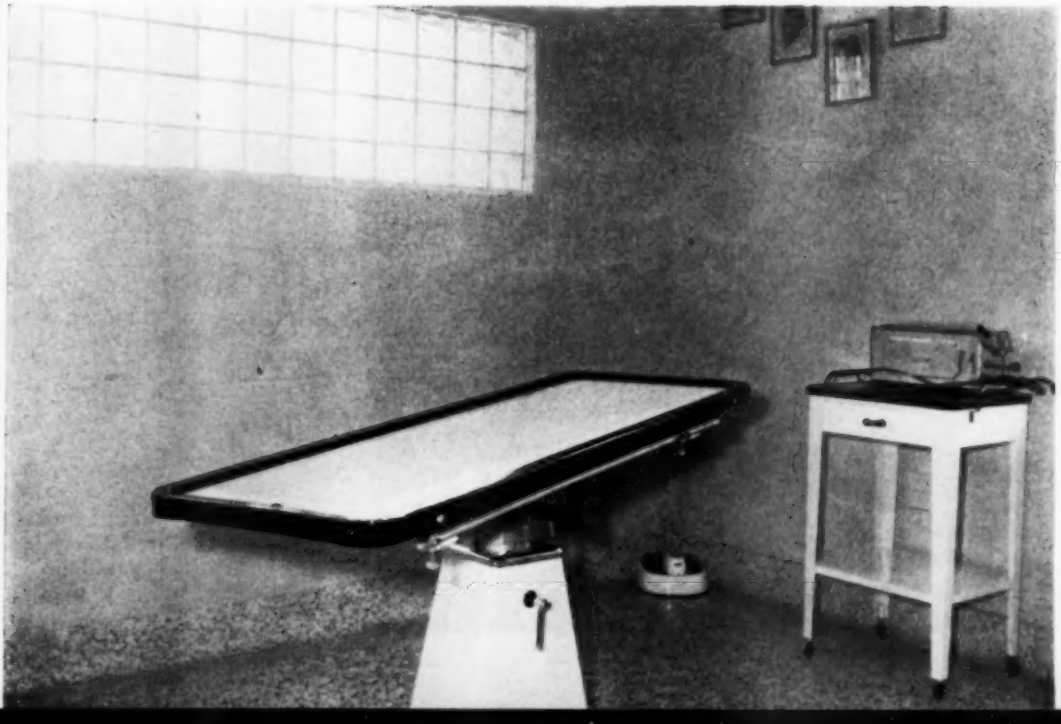

Fig. 4—Kennel room.

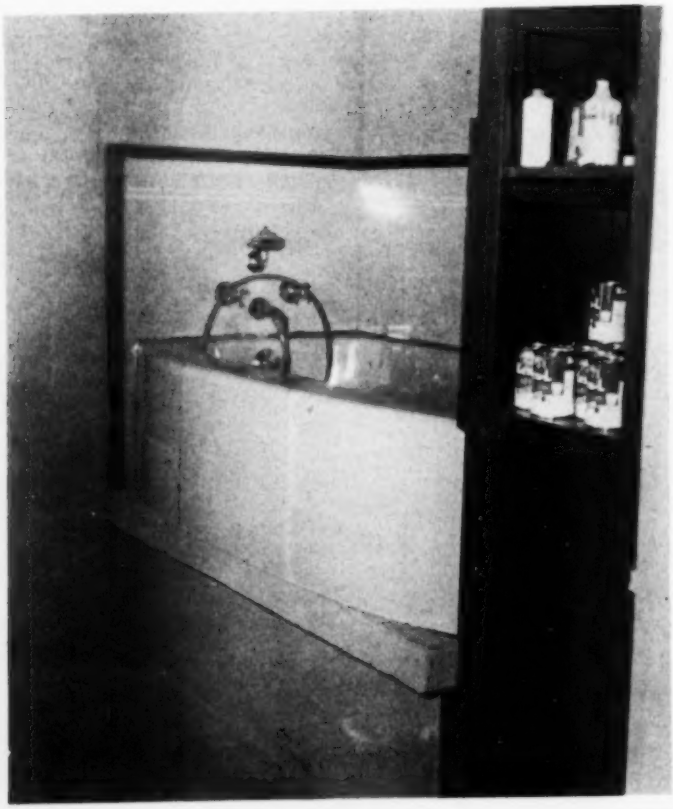

Fig. 5—Bathing and grooming room.

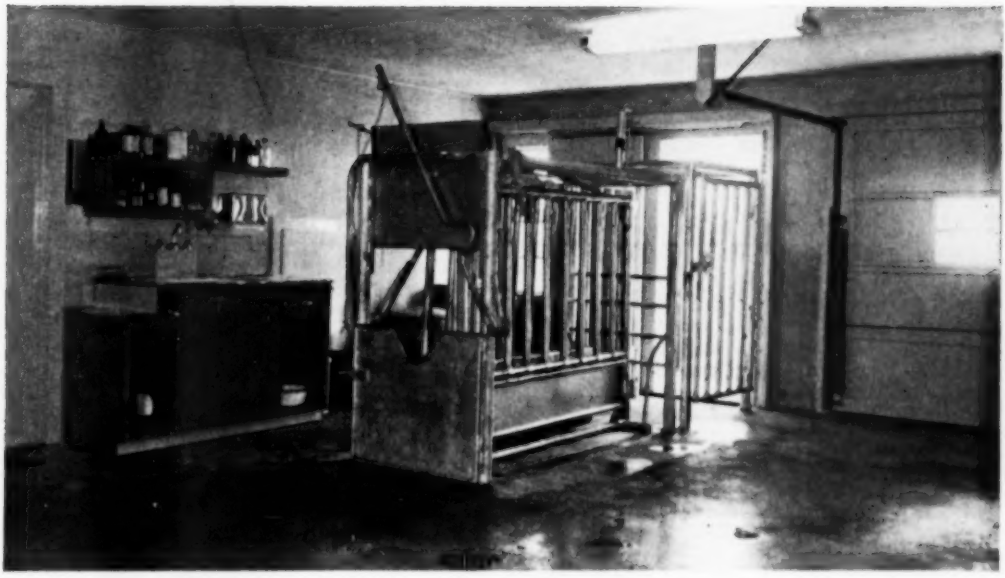

Fig. 6—The squeeze chute and adjacent lavatory.

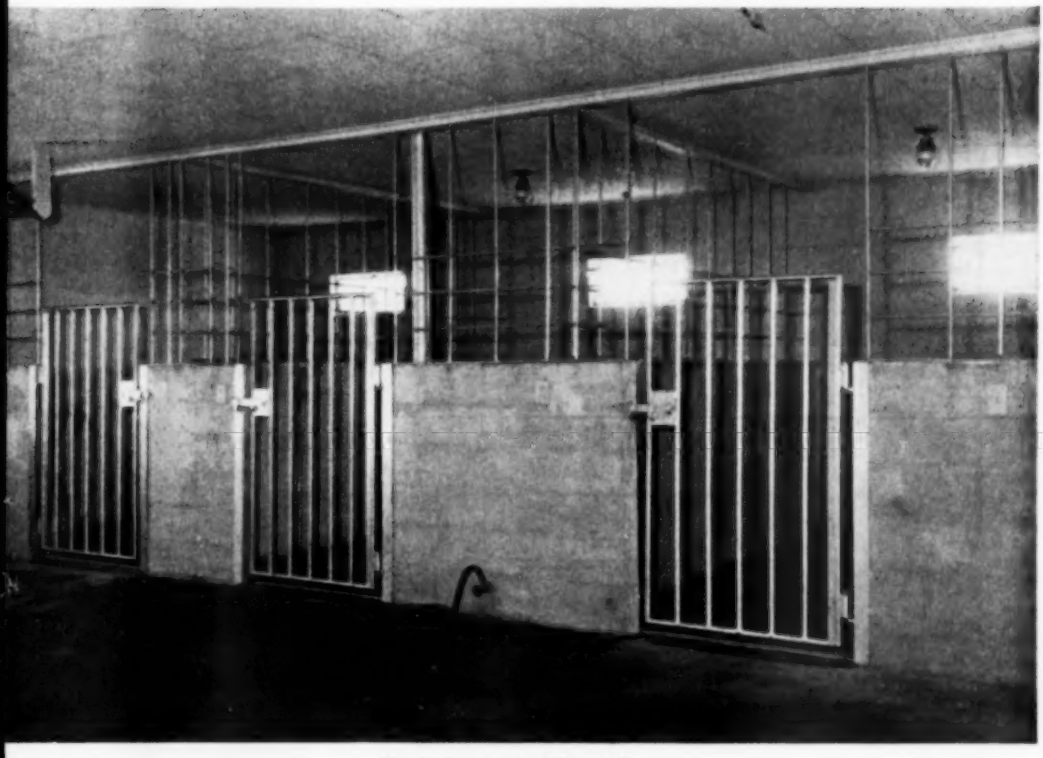

Fig. 7—Large animal box stalls.

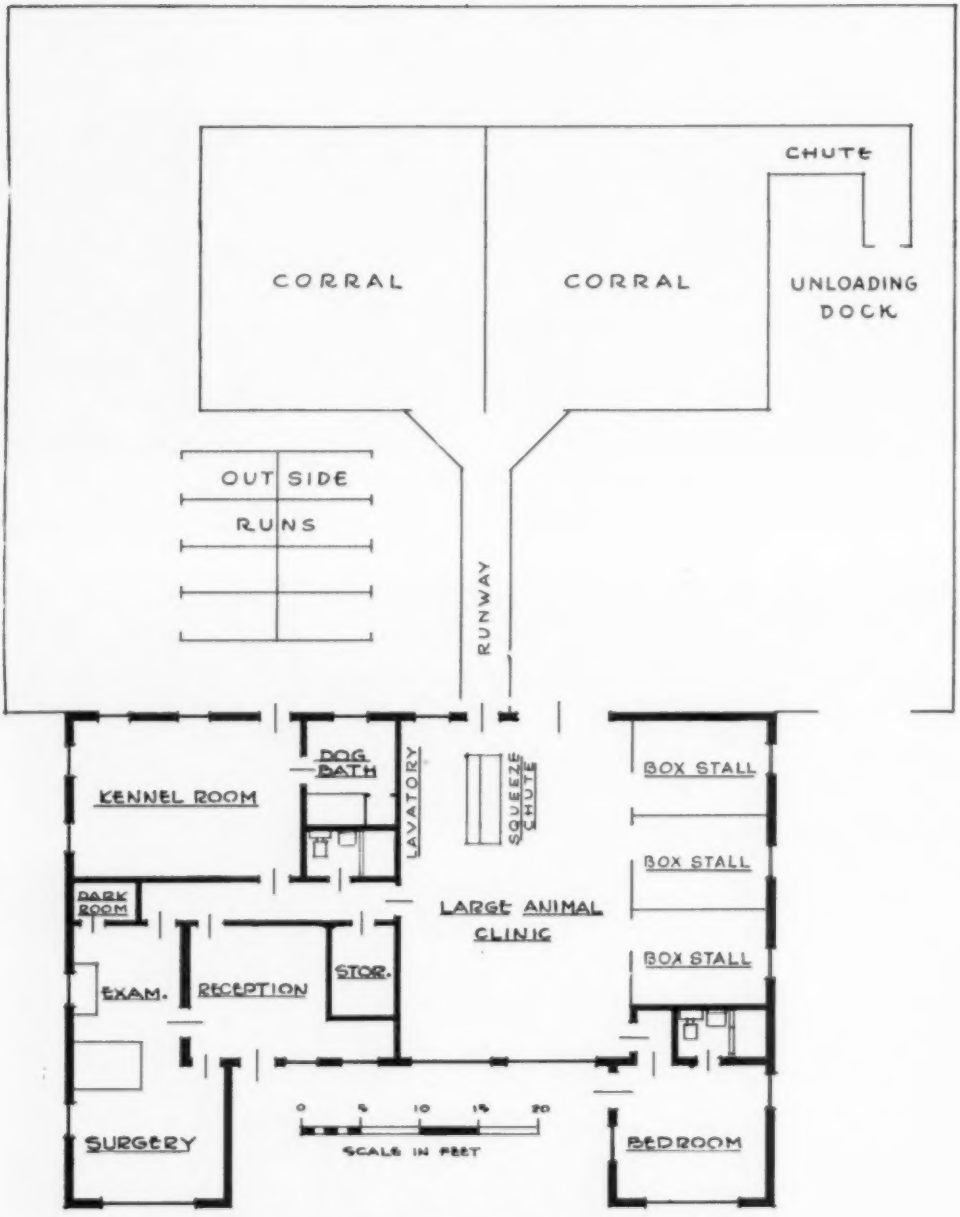

Fig. 8—Floor plans and exercise lots of the Dalhart Animal Hospital, Dalhart, Texas.

(Continued from page 260.)

feedlot diseases and conditions, with an extremely large amount of nutritional deficiencies being encountered this year (1952). The cause of our nutritional problems are the extreme drouths that occur in the Southwest.

The small animal phase of the operation of my hospital has been concerned with the hospitalizing of all surgery, accident cases, and some types of noncontagious diseases. Living in a small town as we do, clients require the boarding of their pets and for this reason we do not expose our kennels to contagious diseases.

Johne's Disease Vaccination

An experiment to test a vaccine for sheep against Johne's disease used heat-killed organisms suspended in mineral oil. In 1947, 1948, and 1949, 289 lambs on farms known to be infected were vaccinated when 6 months old; 266 were kept as controls. Whereas 6 per cent of the controls died of paratuberculosis, no deaths occurred in the vaccinated lambs. From postmortem examinations of 225 vaccinated and 194 control sheep, 1.8 per cent of the former and 10.8 per cent of the latter were affected with lesions. Two of the vaccinated lambs probably were infected before vaccination. —*Vet. Rec., Dec. 6, 1952.*

Johne's disease is prevalent on the Guernsey and Jersey Islands. Its spread can probably be traced from there, by exports, to purebred herds and, eventually, to grade herds in this and other countries.—*A. Zeissig, D.V.M., Rahway, N. J., at the Intermountain V.M.A. Meet.*

The Hide Problem

The price per pound of hides, with a few exceptions, was greater than for cattle prior to 1943 but, since then, live weight prices have averaged higher than hides. In 1937, when the Chicago fat steer price was $11.47 per cwt., good hides were 16.4 cents per pound which amounted to 9 per cent of the value of the entire steer. In 1952, steers were $32 per cwt. while hides were 12 cents a pound, only 2 per cent of the value of the steer. The reduced amount of leather used in making shoes has been a big factor. Other substitutes have been used increasingly in soles and heels and recently the footwear which is made completely without leather has risen to 9.5 per cent of the total in 1951.—*Armour's Analysis, Dec., 1952.*

Virus Diseases in Public Health

Newcastle disease is produced by several strains of virus. Some of the less pathogenic can be used as vaccines to protect chickens against the more virulent strains. The virus may affect man's lungs, nerves, and endothelium. Experiments indicate that certain strains may interfere with, or be antagonistic to, some strains of poliomyelitis virus.

Rift Valley fever, a sheep disease in South Africa, is estimated to have affected 20,000 persons in that country in recent years. Other animals are found to be susceptible. Formerly considered a mosquito-transmitted disease, it is now known to be transmitted by infected material also. Veterinarians, farmers, butchers, even housewives handling infected meat, may be affected. Illness lasts about four days but vision is affected and may terminate in blindness. The virus is destroyed by pasteurization but not by freezing.

Teschen's disease, a neurotropic disease of swine somewhat resembling poliomyelitis, has been suspected but not diagnosed in the United States. It killed about 50,000 pigs in Czechoslovakia in 1946.

Recently, about 30 cases of psitticosis have been diagnosed in poultry packing-house workers in the United States.—*Col. Frank A. Todd, Division of Health and Special Weapons Defense, Washington, D. C.*

Toxicity of Red Squill

Red squill is very unpalatable to pigs, sheep, goats, cats, dogs, and cattle. They detect it even at very low concentrations. Baits much weaker than field bait are refused even when the animals are denied other food for thirty-six hours. It produces toxic effects in female pigs, sheep, goats, cattle, cats, dogs, and rabbits in the same doses, per unit of body weight, as those effective in the female rat. The most resistant animals are goats, and the least resistant are cats and calves.

Emesis may occur in some species but can not be relied upon to protect the animal. —*Vet. Bull., Jan., 1953.*

The Veterinary Medical Profession in the Americas— Its Size and Distribution

BENJAMIN D. BLOOD, D.V.M., M.P.H.

Washington, D. C.

ANIMAL DISEASES exert a tremendous influence on the welfare of mankind. The host of zoönoses (diseases naturally transmitted between vertebrate animals and human beings) of course are of direct public health importance. Many other animal diseases, both nutritional and physiological as well as infectious and parasitic, serve to reduce man's supply of foods of animal origin, and thereby contribute to human malnutrition.

It is patent that the first and most important requirement for controlling these animal diseases, which have such a marked effect upon human health and welfare, is an adequate number of well-qualified veterinarians. Continuous efforts are made to evaluate the size and distribution of animal disease problems. The data presented here was collected and processed in an effort to evaluate resources in personnel technically trained to lead the attack upon those problems. The midcentury, 1950, was selected as the basis for this study since it was, in most countries, a census year.

BASIS FOR CALCULATIONS

It is believed that at least three main factors must be considered in evaluating the size and distribution of the veterinary medical profession. One of these is the size of the human population, because the demand for certain types of veterinary service increases in direct proportion to increases in the total number of people. The second factor is the size of the area involved; this serves as some indication of the distance that must be covered in rendering veterinary service and of how thickly or thinly the service is spread. A compilation of information for the 22 American nations and 18 nonsovereign territories as to human population and land area is presented in table 1. No attempt is made here to estimate just how much weight should be given to these two factors, but certainly they are of considerably less importance than the third: the total animal population.

Difficulties arise with attempts to present a single comprehensive figure on the assets in domestic animals for each country. It was, therefore, decided to use the term, "animal unit," with a relative value assigned to each animal species. In the calculation of animal units, the cow, the horse, and closely related animals are given the value of one unit each. Three llamas or alpacas are considered as one unit. As for sheep, goats, and swine, 5 of these animals are required for one unit. Finally, we require 100 chickens, ducks, geese, turkeys, and other domestic fowl to comprise one animal unit.

The total animal populations are presented in table 1, by species and by animal units, for each of the countries and territories. Doubtlessly, some will disagree with the method of computing animal units. Although somewhat arbitrary, it has served as a means of showing the total domestic animal population that is in potential need of veterinary service. Dogs and cats have not been included in our calculations, even though they definitely require veterinary service. However, for most countries, it is not yet possible to obtain reasonably accurate information on the number of dogs and cats.* Furthermore, it is believed that the inclusion of these animals would not materially alter the proportions of animal units by country or territory. The same may be said about wild animals which, since they too suffer from diseases of great importance to human health and economy, also require veterinary service. Yet, in

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This paper was originally presented as a preliminary report at the First Pan American Congress of Veterinary Medicine, in Lima, Peru, 1951. It was also published (in Spanish) in the "Boletin de la Oficina Sanitaria Panamericana," 31, (Nov., 1952): 391-393.

Sincere thanks are extended to the numerous individuals and agencies, both private and public, that have so kindly coöperated in making available the information on which this study is based. The great aid of Mrs. Lea Orr and Miss Maria L. Aldea, in collecting and processing the numerical data, is also gratefully acknowledged.

*If the number of dogs and cats were to be expressed in terms of "animal units," it is believed that 25 individuals should comprise one unit.

TABLE 1—Population, Area, Number of Animals, and Distribution of Veterinarians in the Countries and Territories of the Americas for 1950

Country or territory	Population	Area in km.²	Domestic animals (in thousands)						Total animal units	Number of veterinarians	Animal units / Human population: Ratios per veterinarian		Area in km.²
			Equine	Bovine	Ovine	Caprine	Swine	Poultry					
COUNTRIES													
Argentina	17,425,000	2,794,015	7,250[1]	41,048[1]	51,295[3]	4,932[3]	2,955[1]	46,827[1]	60,675[2]	1,600	37,920	10,511	1,746
Bolivia	3,990,000	1,069,094	1,070[1]	3,849[1]	4,195[3]	1,910[3]	1,200[3]	5,062[1]	7,058[3]	56	126,036	71,250	19,091
Brazil	52,645,000	8,516,037	11,610	52,655	14,251	8,526	26,059	11,000	74,142	1,503	49,329	35,026	5,666
Canada	13,893,000	9,953,471	1,683	8,992	2,015	—[4]	5,247	64,886	12,776	1,350	9,464	10,291	7,373
Chile	5,877,000	741,767	600	2,331	6,435	800	600	6,000	4,578[5]	206	22,223	28,529	3,600
Colombia	11,260,000	1,139,155	1,980	14,500	1,200	461[3]	2,200	18,600[1]	17,438	275	63,775	40,945	4,143
Costa Rica	794,000	51,011	263[1]	611[1]	28[1]	333[1]	546[1]	1,043[1]	1,066	6	177,666	132,333	8,502
Cuba	5,400,000	114,524	37[1]	4,600[1]	114[3]	84[1]	1,800[3]	8,500[1]	5,122	537	9,538	10,056	213
Dominican Republic	2,121,000	49,543	266	602	28	340	1,140	2,245	1,192	8	149,000	265,125	6,193
Ecuador	3,077,000	275,000	211	1,600	1,802	346	1,140	2,469	2,493	18	138,500	170,944	15,277
El Salvador	1,859,000	34,126	183[1]	765[1]	8[1]	18[1]	348[1]	1,890[1]	1,042	6	173,666	309,833	5,687
Guatemala	2,787,000	108,889	70	800	610	65[1]	340	3,500	1,108	19	58,316	146,684	5,731
Haiti	3,112,000	27,750	109	250	10	300	175	5,350[1]	509	4	127,250	778,000	6,937
Honduras	1,534,000	153,226	301	950	9	21	407	1,961	1,358	3	452,666	511,333	51,075
Mexico	25,715,000	1,969,367	7,056	14,797	4,838	7,201	5,553	38,555	25,757	383	67,251	67,141	5,142
Nicaragua	1,053,000	148,000	279[1]	1,275	15[1]	7[1]	250[1]	1,502[1]	1,623	0	—	—	—
Panama	802,000	74,010	119[1]	573	0[6]	1[1]	196	1,866	750	10	75,000	80,200	7,401
Paraguay	1,406,000	406,752	498	3,400	300	15[1]	150[1]	4,182[1]	4,033	18	224,055	78,111	22,597
Peru	8,405,000	1,249,049	1,100	2,639	17,748	924	864	6,595	8,114[7]	57	142,351	149,211	21,913
United States	149,215,000	7,827,680	7,120	84,179	31,505	2,441	65,028	466,686	115,761	16,000	7,235	9,326	489
Uruguay	2,365,000	186,926	583	8,000	26,000	17	270	6,049[1]	13,900	296	46,959	7,990	632
Venezuela	4,986,000	912,050	428	5,360	60	1,410	1,293	6,000[1]	6,301	170	37,653	29,329	5,365
Total	319,721,000	37,801,442	42,816	253,776	162,466	30,152	117,761	710,768	366,896	22,525	16,288	14,194	1,678
TERRITORIES													
Alaska	128,643	1,518,717	1	2	17	0	1	20	6	3	2,000	42,881	506,239
Bahamas	79,000	947	3[1]	4[1]	22[1]	15[1]	8[1]	380[1]	20	1	20,000	79,000	11,404
Barbados	211,682	431	5[1]	13[1]	33[1]	16[1]	24[1]	274[1]	36	3	11,667	70,561	144
Bermuda	37,254	54	1	1	0[6]	1	3	59	3	3	1,133	12,418	18
British Guiana	425,156	214,962	13[1]	186[1]	44[1]	15[1]	28[1]	488[1]	221	5	44,200	85,031	42,992
British Honduras	67,000	22,965	4	18	2	—[4]	14	61	26	1	26,000	67,000	22,965
French Guiana	28,506	91,000	0[1]	2[1]	0[1]	0[1]	8[1]	7[1]	4	1	4,000	28,508	91,000
Guadaloupe	289,000	1,780	10[1]	67[1]	8[1]	18[1]	21[1]	127[1]	88	2	44,000	144,500	890
Hawaii	499,784	16,661	10	160	13	0	53	640[8]	189	20	9,450	24,989	833
Jamaica	1,237,063	11,424	90[1]	230[1]	13[1]	26[1]	218[1]	1,793[1]	436	13	33,538	95,159	879
Leeward Islands	114,647	1,092	3[1]	21[1]	16[1]	21[1]	12[1]	100[1]	35	4	8,750	28,662	273
Martinique	273,000	1,102	9	45	24	15	40	109	71	3	23,667	91,000	367
Netherlands Antilles	163,000	947	2[1]	4[1]	21[1]	7[1]	4[1]	45[1]	26	1	26,000	163,000	947
Puerto Rico	2,210,703	8,996	63[1]	384[1]	103[1]	8[1]	220[1]	2,000[1]	533	40	13,325	55,267	225
Surinam	192,000	142,822	2[1]	40[1]	1[1]	1[1]	7[1]	158[1]	46	2	22,500	96,000	71,411
Trinidad and Tobago	635,839	5,128	8	34[9]	19	500	32	400	156	13	12,000	48,911	394
Virgin Islands	26,654	344	2	6	1	3	2	25	9	1	9,000	26,654	344
Windward Islands	275,932	2,126	1	20	15[10]	15[10]	12[10]	100[10]	29	1	29,000	275,932	2,126
Total	6,894,863	2,051,955	225	1,237	352	965	707	6,786	1,934	117	16,530	58,930	17,538
Grand Total	326,615,863	39,853,397	43,041	255,013	162,818	31,116	118,468	717,554	368,830	22,642	16,294	14,425	1,756

[1]Most recent data available (not 1950). [2]Includes 1,882,000 llamas, alpacas, etc. [3]Includes 60,000 llamas, etc. [4]Included with sheep. [5]Includes 1,207,000 llamas, alpacas, etc. [6]Less than 1,000. [7]Includes 219,809 llamas, vicuñas, etc. [8]Includes rabbits. [9]Includes water buffalo. [10]Estimation.

spite of their importance, it was not possible in this study to allow for populations of wild animals.

THE VETERINARY MEDICAL PROFESSION

The number, in 1950, of qualified veterinarians in each of the American countries and territories is presented in table 1. By "qualified veterinarians" is meant those persons who have graduated from a school of veterinary medicine that is recognized as such in the country in which it is located. Our totals may be in slight error in a few instances, yet every reasonable effort has been made to obtain accurate information. Unfortunately, in many countries there is no agency responsible for maintaining current data on the number of active veterinarians. In a few cases, no licensing procedure exists; in others, the only information maintained is the record of initial issuance of license. Such records do not reflect the number of veterinarians actually practicing their profession. Even so, the totals have, so far as is possible, been adjusted to eliminate those no longer active in veterinary medicine.

The table also contains a series of three ratios for each of the countries and territories. Those ratios reflect (1) the number of animal units per veterinarian; (2) the number of human beings per veterinarian; and (3) the number of square kilometers per veterinarian. Undoubtedly, the veterinarian/animal-unit ratio provides the best means of comparing the availability of veterinary service in the national and territorial subdivisions of the Americas. There is no existing single criterion for measuring the adequacy of veterinary service in an area. In the absence of such a tool, it is possible only to make comparisons between areas. Nine territories and three countries possess veterinarian/animal-unit ratios more favorable than the same ratio for the continent as a whole.

SUMMARY

This study presents the number and distribution of veterinarians, by individual country and territory, in the American continents, for the year 1950. Ratios of veterinarians to domestic animal population, veterinarians to human population, and veterinarians to square kilometers, are calculated for the individual countries and territories. This information may be used in evaluating or comparing the available veterinary medical service in the various parts of the Western Hemisphere.

Liver Abscesses and Gastritis

A recent release from the Division of Veterinary Medicine, Colorado A. & M. College, states that a study made on the livers and stomachs of over 1,500 cattle suggests that there is a direct relationship between liver abscesses and stomach injuries. In the past the abscesses, telangiectasis, and sawdust livers were linked with the *Actinomyces necrophorus* infection of foot rot and calf diphtheria. Now it appears that the liver infection may gain entrance through lesions in the stomach. Because many of these lesions are believed to be due to extreme acidity of the stomach, there is a possibility that neutralizing this acidity might prevent these liver lesions.

When a cholera virus passage through 15 rabbits was used experimentally on 10-week-old pigs, virus was recovered from some of them for six weeks One cubic centimeter of blood from 1 of these pigs would kill 1,000 cholera-susceptible pigs, with an incubation period of only eighteen hours.—*James Baker, D.V.M., Ithaca, N. Y., at the Intermountain V.M.A. Meet.*

Halogeton poisoning, which is most apt to occur when sheep graze on the plant along the trails when being moved, can be largely prevented if they are fed just before moving or if they are hurried through infested areas.—*C. H. Kennedy, D.V.M., Elko, Nev.*

Foot-and-mouth disease in an early outbreak was spread by the inspectors until they switched to a lye solution for washing their rubber gloves, boots, etc. The mercuric chloride solution first used proved incapable of killing the virus.—*R. E. Duckworth, D.V.M., Sacramento, Calif.*

Fluoride poisoning in cattle causes the teeth which are then forming to be mottled, soft, and sensitive; some affected animals "lap" cold water. It also causes some bone exostosis.—*M. L. Miner, D.V.M., Logan, Utah.*

The Armed Forces Institute of Pathology and Its Relation to Veterinary Medicine

Major CHESTER A. GLEISER, V.C., U.S. Army

Washington, D. C.

THE ARMED Forces Institute of Pathology is the central agency for consultation, diagnosis, research, and advanced training in pathology for the United States Army, Navy, Air Force and, on a coöperative basis, for the Veterans Administration. These services are furnished by closely integrated departments: Department of Pathology, American Registry of Pathology, Medical Illustration Service, and Medical Museum, with a supporting administrative department.

Originally established as the Army Medical Museum by Surgeon General William A. Hammond during the Civil War to assist in training Army surgeons in the handling of war injuries and medico-military diseases, it has grown into the center of pathology today with its vast collection of medical and surgical cases, together with related pathological specimens and illustrative materials.

The original specimens contributed to the museum consisted of bones obtained from autopsies or amputations, and gross tissue specimens displayed in wide-mouthed glass jars. Following the Civil War, the scope of the museum activities was broadened to include specimens illustrating all types of wounds, injuries, and diseases, particularly those of public health and military importance. Civilian physicians became interested in contributing to the collection, and by 1876 the institution, with nearly 19,000 specimens, was attracting world-wide attention.

By 1888, the scope of the collection had been broadened from medico-military subjects to include anatomy, physiology, general pathology, somatic anthropology as applied to medicine, and instruments and apparatus used for teaching and research.

Much excellent pathological material was contributed during World War I, and by the beginning of World War II the laboratory and research activities had taken precedence over the museum function. The Army Medical Museum was designated the central laboratory of pathology for the Army, and this resulted in expansion of the scope of the activities to meet the needs of the rapidly growing Army. The emphasis on consultation and diagnostic services in pathology was recognized officially in the change of the name of the Museum to "Army Institute of Pathology." Its facilities were extended to the Veterans Administration on a coöperative basis in 1947.

Following the unification of the Armed Forces, the Institute was redesignated "Armed Forces Institute of Pathology," and it is now operated jointly by the Army, the Navy, and the Air Force.

The AFIP is an independent activity directly under the command of the Surgeon General of the Department of the Army, with its broad policies controlled by the board of governors, comprised of the surgeons general of the Army, the Navy, and the Air Force.

A scientific advisory board, whose members are outstanding men in the field of pathology, may be called upon by the director to advise him in all matters concerning the operational activities of the AFIP and problems related to research and training programs.

The professional staff is drawn from both military and civilian sources and is made up of qualified pathologists. In addition to this staff, a group of distinguished scientists come to the AFIP for varying periods to act as resident consultants and to pursue special investigations. This group, which represents many of the leading educational institutions of the United States, has done much to stimulate a close liaison with the medical leaders of the country and to familiarize the civilian profession with the potentialities of the Institute for education and research.

The AFIP is housed, together with the Armed Forces Medical Library, at Seventh Street and Independence Avenue, S. W., Washington, D. C. The present building, which was erected in 1887, is no longer

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adequate for the needs of the AFIP, and a new building is under construction at the Walter Reed Army Medical Center. Completion is anticipated by 1954. Facilities for experimentation, which have been lacking because of limited space, will be provided in the new building.

FUNCTIONS

The functions of the AFIP are varied and numerous and only the most important will be defined: (*a*) It furnishes consultation and diagnostic services in pathological anatomy for the Army, Navy, Air Force, Veterans Administration and, when practicable, other federal and civilian agencies, as well as to qualified individuals. (*b*) It conducts investigations and research on the pathology of diseases and injuries of medico-military importance. (*c*) It provides advanced training in pathological anatomy to medical officers and, within the limits imposed by current conditions, to other qualified persons. (*d*) It houses and acts as custodian for the American Registry of Pathology. (*e*) It maintains and operates the Medical Illustration Service. (*f*) It maintains and operates medical museums for educational purposes within the Armed Forces, other federal and civilian agencies, and for the lay public. (*g*) It houses and acts as custodian for the pathological material consigned to it by the Atomic Energy Commission.

Armed Forces Regulations designate the AFIP as the central agency for study of the pathology of diseases of medico-military importance. This centralization of facilities, material, and expert pathologists provides an opportunity for broad investigative and research programs that could not be accomplished in multiple smaller units.

Department of Pathology.—The Department of Pathology is the heart of the Institute. To the laboratories come all the pathological materials from every source, and from them emanate the reports on tissues sent in for consultation.

The department is subdivided into sections, each specializing in the pathology of a particular field, such as neurology, dermatology, ophthalmology, dentistry, veterinary medicine. Any case which presents a difficult problem in differential diagnosis is reviewed by all, or most of, the entire senior staff, and should major differences of opinion occur, the records and material are referred to civilian authorities outside the Institute, who act as nonresident consultants. This system supplies the Armed Forces with consultation service of exceptional caliber, and this service is also available to civilian pathologists without recompense other than donation of material in the form of slides, blocks, or representative wet tissue, and adequate records.

The training program is the second major responsibility of the department. The AFIP is accredited by the Committee on Education and Hospitals of the American Medical Association for residency training in preparation for the American Board of Pathology. Advanced training is also given experienced histopathology technicians.

The research program carried on by the staff pathologists, students, and resident consultants is the third important responsibility of this department. The fruits of this activity are the publications from the Institute, consisting of articles on a variety of pathological subjects, the atlases in special fields of pathology, and other books.

American Registry of Pathology.—The American Registry of Pathology is a department of the AFIP, operating under the auspices of the Division of Medical Sciences of the National Research Council. The first registry was organized in 1922 for the study of ophthalmic pathology. There are presently 20 registries within the American Registry of Pathology. Each registry is sponsored by a national organization in medicine, dentistry, or veterinary medicine. Some, such as the Registry of Veterinary Pathology, have a broad coverage; others, of which the Bladder Tumor Registry is an example, are limited to relatively narrow fields.

The AFIP does not provide diagnostic service, although exceptions are made in fields in which pathology has not as yet reached a self-sustaining level. The Veterinary Registry is an example of such an exception. At present, materials contributed by veterinary practitioners are accepted for diagnosis.

An activity common to all registries is the study of ill-defined or imperfectly understood diseases through the medium of "follow-up" of representative cases. This is accomplished by sending "follow-up" letters to contributors at regular intervals, requesting information concerning the status of patients.

Another unique feature of the Registry

is the availability of "loan sets," comprised of histological slides based on registry cases, accompanied by a simple syllabus. These "loan sets" covering many fields of pathology are available for loan without charge to any physician, dentist, or veterinarian in the United States. Illustrated atlases covering many specialties are also available and may be purchased directly from the American Registry of Pathology.

Medical Illustration Service.—The Medical Illustration Service is an outgrowth of the Photographic Department of the Army Medical Museum. It is the agency for the collection, preparation, duplication, publishing, and for the exhibit and file of all illustrative material pertaining to wounds, injuries, and diseases of medico-military importance for the Armed Forces, for the illustration of scientific articles, and for official motion pictures and film strips of a medico-military nature. Whenever possible, this material is made accessible to other federal services, civilian medical institutions, and qualified physicians, dentists, and veterinarians.

Medical Museum.—The Medical Museum is the parent organization of the Armed Forces Institute of Pathology. In the course of time, the Medical Museum has grown to be the largest museum of its kind in the world. The exhibits on view illustrate not only wounds of war but also representative specimens of all diseases that afflict man and the animals of use to man. Plans are being made for division of the present collection into three major components: a Medical Science Museum, an Advanced Teaching Museum, and Public Museum.

THE AFIP IN VETERINARY MEDICINE

The AFIP serves veterinary medicine in several ways. The Veterinary Section in the Department of Pathology provides a diagnostic pathological service to the Veterinary Corps of the Army and the Air Force. Active research is being conducted on the pathology of total body radiation in animals and, in coöperation with the New York State Veterinary College at Cornell University, on the pathogenesis of chronic canine leptospirosis. Other problems are also under investigation.

Through the Registry, about twelve outstanding veterinary pathologists of this country have contributed chapters to an atlas, "Veterinary Necropsy Procedures," which will be published within the next six months. The former registrar, Lt. Col. T. C. Jones, is the editor of this volume which will contain chapters on the necropsy of domestic, laboratory, and wild animals, illustrated by diagrammatic drawings, and other chapters on the collection of pathological material and parasites for laboratory study, discussion of technical procedures, and preparation of the protocol.

Through the medium of the Registry of Veterinary Pathology, which is sponsored by the American Veterinary Medical Association, the AFIP is rendering a service to the entire profession. The Veterinary Registry is one of the few registries which maintains a diagnostic service for civilian practitioners.

The facilities of the AFIP are available to veterinarians who may wish to study specific problems. Any graduate veterinarian wishing to come to the AFIP for a period of study should write to the Director, Armed Forces Institute of Pathology, 7th Street and Independence Avenue, S. W., Washington 25, D. C., and indicate when he would like to come, for how long a time, and what he would like to study. If space is available at the particular time, he will be accommodated.

The AFIP supports the veterinary profession and, reciprocally, deserves the support of the entire profession, particularly the veterinary colleges and other institutions. Your contributions are needed. Before placing those good specimens, particularly from a study or research project, on a shelf to collect dust and perhaps to be forgotten or even lost, send them to the AFIP so that they can be reviewed, indexed, and filed; thus they will always be available to interested investigators.

A Mule-Footed Cattle Problem.—Mule-footed calves with a single hoof instead of two toes on from one to four feet have shown up in a few Holstein-Friesian herds. This condition has not been noticed in other breeds. Kansas State College has warned that these animals usually go lame and, since it is probably a hereditary condition, such calves should be slaughtered. The odds are that both dam and sire are carriers; therefore the sire should be sent to the butcher and no breeding stock kept from the cows.—*Farm J., Feb., 1953.*

Cesarean Section in Ewes

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WITH THE POSSIBLE exception of the sow, perhaps no other species of farm animal lends itself to surgery for relief of dystocia as much as the ewe. Due to the small birth passage, many veterinarians are unable to do much manual manipulation of a fetus without danger of tearing the cervix or uterus. At times, one of a pair of twins, or an exceptionally large single fetus, is dead and blocks the birth passage completely. Excessive traction, even with lubricants, can be harmful from the standpoint of trauma and shock, the ewe dying in the following twenty-four hours or so afterward. For the past few years, we have utilized cesarean section extensively in our ambulatory and large animal hospital clinics. As in all prospective cesarean patients, regardless of species, the one paramount factor (and in sheep this can not be overemphasized) is that the operation be decided upon early, before the ewe has become exhausted. Pregnancy disease is another condition that often will not terminate successfully unless a cesarean section is done.

PREPARATION

The wool covering the right paralumbar fossa and loin region is sheared off and the area thoroughly scrubbed with liquid germicidal detergent (Parke, Davis & Company). Paravertebral lumbar anesthesia is effected, using a single 2-in., 19- or 20-gauge hypodermic needle. In only the largest sheep is it necessary to use a 3-in. needle. Two per cent procaine solution, or 1 per cent cyclaine (Sharp & Dohme) is used as the anesthetic agent. One million units of procaine penicillin is administered intramuscularly in the hip region while waiting for the anesthetic to work. If much lay interference has occurred and the vulva and vagina are traumatized extensively, it is wise to administer 2 or 3 cc. of tetanus antitoxin at this time. It is preferable to keep the ewe standing, with the herdsman kneeling facing the ewe's left side. In this manner, he is able to steady the patient with one arm in front of the ewe's chest and the other behind the rear quarters. Most ewes are quieter this way. It is also more convenient for the operator if the patient and handler are on top of a table or work bench. If the ewe is unable or will not stand, she may be restrained in left lateral recumbency.

TECHNIQUE

A vertical incision is made in the center of the right paralumbar fossa starting about 1 in. ventral to the lateral extremities of the transverse processes of the lumbar vertebrae and carried ventrally for approximately 6 in., through the skin, muscles, and peritoneum. Care should be exercised as the muscle layers are often surprisingly thin. Large bleeders are clamped off with hemostats, usually only one or two are necessary. As most of these cases are for twin pregnancy, the small intestines are gently pushed forward with the right hand and the left hand is used to slip over the dorsal aspect of the uterus to move the right horn up into the abdominal incision. A careful incision is now made along the greater curvature of the right horn, and the first fetus is removed. The operator then reaches through the uterine incision and passes over into the left horn and removes the second fetus through the right horn incision. If only 1 fetus is present, the uterine incision is quickly accomplished along the dorsolateral aspect of the enlarged gravid horn. The fetal membranes are easily removed by applying gentle traction. One or two sulfa-urea uterine bolets are placed in the apex of each horn and the uterus prepared for suturing.

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If assistants are available, it is handy to grasp the uterus with two pairs of vulsellum forceps, placing them about 1 in. from either extremity of the uterine incision. If not, the operator can get along nicely by grasping a fold of the uterine wall between thumb and forefinger an inch or so below the lower extremity of the uterine incision. In this manner, it is easy to place the first anchoring catgut suture and then use the suture material itself to hold the uterus up into the incision as it is sutured. Single strand, No. 2 chromic catgut is used to close the uterine incision. An anchoring tie is made approximately 1 in. from the lower extremity of the uterine incision, leaving the free end of catgut protruding about 2 in. from the surgeon's knot. Then a series of continuous right angle Cushing sutures are rapidly placed dorsally up the length of the incision to a point about 1 in. beyond the proximal extremity of the uterine incision. Without tying, the suturing is reversed, using the same suture, and tied at the projecting piece of catgut left when the initial anchor suture was made. Thus, the first row of sutures closes the uterine incision, inverting the incision lips, and brings serosa to serosa, and the second layer effectively buries the first layer.

A 7.5-cc. tube of the standard penicillin, streptomycin, and sulfamerazine mastitis ointment is now squirted over the suture line of the uterus and this organ replaced. The abdominal incision is closed with three or four figure-8 sutures of ¼ in. cotton umbilical tape. This suture is accomplished in the following manner: Penetrate the skin on the right side of the incision, at approximately ¼ in. from the lip, from the outside to the subcutaneous area. Then cross over to the left side of the incision and penetrate the muscle layers and peritoneum. Now cross to the right side again and bring the suture out through the peritoneum and muscle layers of the right side. The suture is then carried to the left side of the incision and the skin pierced from the subcutaneous to the external surface at approximately ¼ in. from the edge of the incision. Do not tie this suture at this time. Leave the ends long, and place the remaining two or three as need be. Then tie by drawing the suture ends laterally to close the peritoneal and muscle layers and the surgeon's knot closes the skin. One or two interrupted skin sutures can now be placed to close any portion of the skin incision not adequately sealed by the figure-8 sutures. Healing powder is sprinkled on the skin surface and the ewe placed in a warm dry place. It is well to segregate her for a few days. As a rule, no further antibiotic therapy is necessary, and the cotton sutures are removed about the tenth day.

It is advisable to commence the uterine sutures at the anterior or distal portion of the uterine incision because marked involution occurs quite rapidly in many cases. This is a favorable sign. Therefore, it is easier for the operator to finish up his suturing and tying where he can see and use his hands more freely. This is an important point to an operator with large hands.

Supportive intravenous therapy and follow-up doses of 300,000 units of penicillin are indicated in patients that were exhausted prior to surgery. The latter need not be administered until the third and fifth days postoperative if penicillin in oil is used.

Cesarean Section in the Ewe

Among indications for this operation are partial dilation of the cervix, prolapse of the cervix prior to the onset of labor, and miscellaneous indications. When there is a partial dilatation of the cervix it usually has a tense, hard, ringlike feel and will not relax with manipulation. Such a cervix will seldom, if ever, dilate fully. Epidural anesthesia has been recommended for such cases but the author has found it of no value.

Prolapse of the cervix most frequently occurs within fourteen days of lambing time and it should be reduced and the vulva sutured. The condition may recur if the sutures tear out but the cesarean operation should be postponed to as near the normal time of parturition as possible for two reasons: (1) The ewe will come to her milk more quickly and (2) the lambs will be stronger.

Miscellaneous indications include dystocias and pregnancy toxemias. In 3 cases of pregnancy toxemia which were operated on, 2 were in an advanced stage of toxemia and died within twelve hours. The livers of both were in an advanced state of fatty

degeneration so that recovery could scarcely have been expected.

Procedure.—Several anesthetics have been tried but the epidural method is preferred. While general anesthetics are harmless to the ewe, several lambs died apparently from their effect. From 4 to 6 cc. of a 2 per cent solution of procaine is injected through the lumbosacral junction, using a No. 19 needle. Satisfactory anesthesia is usually secured and should last about an hour. The ewe is then restrained on her back on a table, with the head raised about 6 to 8 inches, to prevent regurgitation and also the ascending of the spinal anesthetic. The hind limbs of the ewe are tied but an assistant holds the head and forelimbs. The wool is then plucked from the operation site and the area is cleaned and disinfected.

Technique.—An incision is made through the abdominal wall about 2 inches to the left of the midline, medial to the left mammary vein, and forward for about 6 inches from a point 2 inches in front of the udder. The uterus is then brought into the wound and the fetus is held through the uterine wall. In this operation the rear end of the lamb is presented in about 90 per cent of cases. A 6-inch incision through the uterine wall is then made over the hocks avoiding the cotyledons, and the fetus is grasped by the hocks and withdrawn.

The sudden cold air may cause the lamb to inhale before its head is delivered, filling its lungs with amniotic fluid and causing death. A warm sterile cloth over the hind quarters during extraction may prevent this. If the head is presented, the incision is made over the fetal neck and head and the fetus is withdrawn by the head. When a twin is present in the other uterine horn, it is withdrawn through a separate incision. No attempt is made to remove the fetal membranes. They are merely trimmed off with scissors and the remainder returned to the cornu. The uterus is closed with a continuous medium chromic catgut, using a Lembert suture. If the lamb is putrid or if peritonitis exists, a tube of intramammary penicillin is squeezed along the uterine incision after suturing. The abdominal muscles and peritoneum are sutured at the same time with No. 4 catgut, using interrupted sutures and adding one or two tension sutures. Interrupted nylon sutures are used in the skin. The operation usually requires about forty minutes.

The prognosis depends upon the condition of the ewe and the rapidity with which the fetal membranes are expelled. If the membranes are retained for twelve hours, the ewe is given 100,000 units of penicillin intramuscularly daily for four days. After expulsion, she is placed in a paddock where she can graze. No special diet is required and the sutures are removed about the tenth day. Twenty-six ewes have been operated on, with 19 survivals and 7 deaths. Four of the deaths were due to peritonitis, 2 to pregnancy toxemia, and 1 ewe with an anasarcous fetus was destroyed because of edema of her uterus. Of the 51 lambs delivered, 41 were alive at delivery but only 23 survived.—*Vet. Rec., Nov. 1, 1952.*

Efficacy of Estradiol Cyclopentyl-Propionate (ECP) in Anestrus Ewes

Numerous attempts have been made to induce estrus and ovulation in anestrus ewes with the thought of eventually increasing lamb production and employing controlled breeding.

With this thought in mind an experiment was designed to evaluate the use of ECP under field conditions. Injections were conducted during the spring and summer of 1952. Seventy-seven ewes, four rams, and four breeds were employed in this experiment. The ewes were injected so that a ram would not have to breed more than six ewes at any one time over a period of four days. The dosage of ECP employed varied from 2 mg. to 8 mg. It appears that a 2 mg. dose is satisfactory for estrus production.

Estrus was induced in 90.9 per cent of the ewes following a single injection of ECP.

Rams were permitted to run with the treated ewes. All ewes were bred as they came into estrus. Many ewes were bred twice during the estrous period.

Twelve out of the 77 ewes treated exhibited estrus the first day (in 24 hours) following the injection of ECP; 41 the second day; 13 the third day; and 4 the fourth day. Seven ewes out of the 77 treated with a single injection of ECP failed to exhibit estrus.

Only 1 ewe out of the group of 77 ewes treated with a single injection of ECP gave

This is an abstract of a paper which will be published in a forthcoming issue of the AMERICAN JOURNAL OF VETERINARY RESEARCH.

birth to a lamb. The lamb was stillborn and arrived on the 147th day of gestation. It would appear that this ovulation following the use of ECP did not result from the injection, but from a spontaneous ovulation during the nonbreeding season.

Within the limits of this experiment, it would appear that ECP, alone in single injection of from 2 mg. to 8 mg., does not induce in anestrus ewes the definite hormonal stimulation of normal estrus essential for satisfactory fecundation.—*W. G. Venzke, D.V.M., Columbus, Ohio.*

Schlatter's Disease in a Pup

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A 5-month-old Collie pup was presented at the Thomas Animal Hospital on Sept. 4, 1952, showing a peculiar weakness of the rear limbs (fig. 1). The pup had apparently injured itself while crawling under a building when frightened by lightning a week before. The lameness was severe but pain at the stifles was not noticed. There was a sensory paralysis of the rectum and of both rear limbs.

By September 24, sensation was normal. X-ray photographs taken at that time revealed that violent traction through the patellar ligament had caused an avulsion of the tibial tuberosity (fig. 2) in both limbs. Schlatter's disease is seen chiefly in young animals. The only treatment was calcium and vitamin D.

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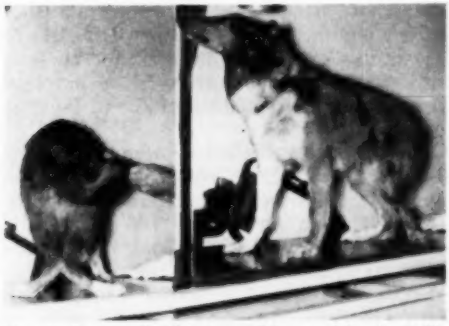

Fig. 1—Rear and side views of leg position in Collie with Schlatter's disease.

Fig. 2—Avulsion of the tibial tuberosity due to violent traction through the patellar ligament.

By October 12, the limbs were much straighter and on January 20, 1953, the dog was almost normal.

Injuries to the Stifle Joint in Dogs

Young dogs frequently injure their stifle joints. In young Greyhounds, nearly all such injuries involve bony structures, most commonly the tibial crest. These pups must have unlimited exercise and they eventually take terrific risks in their frolics, but they seem to have such quickness of eye that hazards seldom cause trouble.

The stifle is far the most vulnerable joint, and injury is almost invariably trauma. These pups will barge past an object or through an opening at high speed and if they collide, it is the stifle which usually suffers. In such cases, the separately ossifying tibial crest is often moved in an upward direction from the main bone. Lameness is severe but pain is not very marked on palpation. The leg hangs just off the ground. Recovery takes place with little or no treatment if the animal is isolated and exercise is limited. It takes three months and sometimes longer.—*Vet. Rec., Nov. 29, 1952.*

Infertility in Cattle – A Review

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A SURVEY of D.H.I.A.* records in 17 states, made by Asdell,[5] shows that about 16.8 per cent of the cows are culled from these herds each year (this does not include cows sold for dairy purposes). Culling due to sterility was found to be rising steadily and it is now the major reason for culling after low production. A great deal of literature relative to infertility of cattle has been published in a wide variety of journals. This paper is intended to review much of that literature with the hope that it will be found useful by veterinary students, practitioners, and research workers.

Infectious Diseases

CONTAGIOUS

Brucellosis.—Brucellosis is well known as a cause of abortion in cattle. Clark,[22] in a study of a large herd for two years, reported that sterility was four times more frequent in suspects, and eight times more frequent in reactors, than in negative animals. Miller and Graves[75] found that brucellosis-positive cows averaged 2.8 services per pregnancy following normal calving; however, those which had aborted averaged 3.6 services. White *et al.*[113] found that nonreactor cows following premature calving required 1.92 services per conception, while reactors required 2.64 services. There is little doubt that brucellosis has an adverse effect on fertility. The effect is most severe following abortion and retention of the after-birth.

According to Boyd,[15] *Brucella abortus* infection is the most common cause of retained placenta. This condition often leads to invasion by secondary pyogenic organisms, and damage to the endometrium may be severe. Although lining epithelial cells are generally capable of regenerating quickly,[95] Hallman[51] has shown that in the uterus proliferation originates in the epithelium lining the gland ducts. Since there are no gland openings in the caruncles,[52] it is likely that superficial connective tissue fills in eroded areas on caruncles. It would, therefore, seem that the greater the number of caruncles damaged, the smaller the chances of successful gestation.

Bovine Venereal Trichomoniasis.—This condition is caused by a protozoan, *Trichomonas foetus*, which inhabits the uterus of infected cattle or the prepuce of infected bulls. According to Morgan,[78] the disease has been reported in 39 states. Morgan and Wisnicky[79] found in a survey of 1,577 bovine uteri obtained from a local packing plant that about 1 per cent of the slaughtered cows were positive for trichomonads. Trichomoniasis is characterized by temporary sterility, early abortions, and antepartum pyometra. It is a herd disease introduced by infected animals and spread almost entirely by coitus. Positive diagnosis is dependent on microscopic demonstration of living *T. foetus*.

Methods of diagnosis and treatment have been summarized by Dikmans.[31] Vaginal samples taken from heifers two to three weeks after service by an infected bull usually contain large numbers of trichomonads. A 16-in. plastic vaginal pipette is used to inject about 10 ml. of sterile saline into the vagina; a 2-oz. rubber bulb is used on the end of the pipette to flush the saline back and forth several times before it is withdrawn and ejected into a test tube. Samples should be examined shortly after collection whenever possible. If necessary, they may be stored overnight in a refrigerator. If samples are to be sent to a laboratory and must be in transit forty-eight to seventy-two hours, it is advisable to send two samples. A few drops of 10 per cent formalin should be added to one of them as a preservative.

A 21- to 24-in. plastic preputial pipette is used for taking samples from bulls. Before taking a sample, the bulls should be withheld from service for a few days and the long hairs clipped away from the sheath. After washing and drying the sheath, the pipette is passed into the preputial cavity. The glans penis and adjacent lining are scraped gently while compressing the rubber bulb. The pipette is then with-

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*Dairy Herd Improvement Association.

drawn and the smegma flushed into a test tube containing about 10 ml. of sterile saline. Preputial samples should be permitted to settle for one to two hours before being examined. The superficial layer of the sediment should then be removed with a capillary pipette and spread in a thin layer on a microslide and examined under low power.

When samples can be collected and examined in a laboratory, Fitzgerald *et al.*[41] have shown that a douche method is more efficacious for obtaining preputial samples. A pipette about 15 cm. in length and 8 mm. in diameter is used with a 4-oz. rubber bulb to introduce approximately 200 cc. of sterile saline into the sheath. One hand is used to close the orifice while the other is used to manipulate the glans penis through the sheath, and to a lesser extent the other regions of the prepuce. Then the fluid is allowed to drain into a beaker. This fluid is centrifuged ten minutes at 2,000 r.p.m. in 50-cc. tubes. After decanting the supernatant fluid, the remaining material is put into a 15-cc. graduated tube and centrifuged again for ten minutes at 2,000 r.p.m. Most of the supernatant is then poured off and the sediment mixed with the remaining fluid. The sample is then removed with a pipette and examined under the microscope.

Bartlett *et al.*[9] reported finding trichomonads in 68.9 per cent of 800 preputial samples, taken by the pipette method, from 10 infected bulls.

Vibrio Fetus.—Infection with *Vibrio fetus* was established as a cause of bovine abortion in this country by Smith in 1918.[97] However, considerably more attention has been given to this disease since 1943 following a report by Plastridge and Williams.[90] Abortions occurring during the first six months of pregnancy and a poor conception rate are reasons for suspecting the presence of vibriosis in a herd.[87] Diagnostic procedures have been described by Plastridge *et al.*[88] and Barner and Oberst.[7] The Vibrio organisms may be seen by microscopic examination of direct smears made of amniotic fluid or stomach fluid. For cultural examination, these fluids are used to inoculate tubes of thiol medium; these are incubated three to six days at 37.5 C. Plastridge *et al.*[89] have described the use of a serum-agglutination test which, with proper interpretation, is considered reliable. However, it appears that vibriosis in the individual animal is of short duration (1 to 3 mo.). Stegenga[101] found it possible to demonstrate agglutinins against *V. fetus* in the vaginal mucus of 59 per cent of the cases of "enzoötic sterility" in the Netherlands. This was not possible in uninfected animals.

Plastridge *et al.*[88] have described a tampon method of obtaining vaginal samples. A gauze tampon (0.75 by 2 in.) with a string attached is placed in the vagina near the cervix. This is accomplished by placing the tampon in one end of a 16 in. by 0.75 in. glass speculum; the tampon is then forced out of the speculum with an 18-in. glass rod. The tampon is left in the vagina for about thirty minutes and then placed in 15 ml. of formolized saline in a 1 in. by 6 in. test tube. The tampon is rinsed by compressing and releasing it with forceps and then it is discarded. The fluid is then centrifuged and the supernatant tested for *V. fetus* agglutinins. While agglutinins are somewhat slower in developing in the vaginal mucus, they tend to persist over a relatively long period. Because of this, the tampon test may permit a positive diagnosis in cases in which the blood reaction has returned to negative.

Plastridge *et al.*[88] have reported beneficial results of treating infected cows by the infusion of streptomycin, aureomycin, or terramycin into the uterus. They have also recommended the use of artificial insemination with diluted semen containing 500 μg. of streptomycin per milliliter.

Vesicular Venereal Disease.—This condition rarely occurs in this country.[8] It is believed to be caused by a virus and is characterized by profuse vesicular eruptions in and upon the copulatory organs of both sexes. The incubation period is about three to six days. The vesicles rupture, leaving ulcers which heal in about two weeks. There is little need for treatment.

Granular Vaginitis.—Granular vaginitis has long been considered an infectious disease. Merchant[73] cites evidence that the disease is caused by *Streptococcus vaginitidis*. Crawley *et al.*[27] have described an unclassified gram-negative rod which was cultured from cows having granular vaginitis. They were able to reproduce the vaginitis in normal heifers by direct transfer of scrapings or by application of pure cultures. Granular vaginitis is character-

ized by few or many nodular elevations in the vulvar mucosa; there is frequently a mucopurulent discharge. Although it is known that many cows reproduce normally in spite of the presence of granular vaginitis, substantial evidence regarding its effect on fertility is lacking. Cunkelman[28] found the disease in 86.9 per cent of 1,000 problem cows which he examined, and he believed the severity was great enough to interfere with conception in 81.5 per cent of them. Treatments for granular vaginitis are many and varied; most of them will reduce the inflammation, but controlled studies of their effect on fertility have not been made.

Folger[42] has reported the successful use of 1 per cent silver picrate in kaolin. Five grams of the powder were insufflated into the vagina every other day for a maximum of three treatments. Williams[104] recommends douching the vagina with 0.25 per cent Lugol's solution in physiological salt solution. This treatment may be given an hour or two prior to coitus or five to ten hours after coitus; it may also be repeated daily for several days. He also states that it may be advantageous to douche the vagina with physiological salt solution immediately prior to copulation. Bulls may be treated by douching the sheath with the 0.25 per cent Lugol's solution in saline.

In severe cases, Staff[101] recommends swabbing the vulva with saturated gentian violet once a week for three weeks. Fincher[38] recommends rubbing 1 per cent acriflavine jelly on the walls of the vulva for about two to five minutes; this is usually repeated three times at five- to ten-day intervals. Daily irrigation of the vagina with a solution of table salt and baking soda, one tablespoonful of each in a gallon of warm boiled water, has also been recommended.[110]

Leptospirosis.—This condition has recently been diagnosed as a disease of cattle and a cause of abortion. York[119] has found 12.8 per cent of the cattle tested in New York to be positive. He reports the herds usually become infected through the purchase of carrier animals and that about 50 to 70 per cent of the animals become infected. Of these, 5 to 10 per cent show severe signs of illness, *i.e.*, fever, depression, loss of appetite, loss of weight, sharp drop in milk production, hemoglobinuria, and the milk becomes thick, yellow, viscous, and may be blood-tinged. These latter symptoms may be confused with mastitis but the udder is not inflamed. About 30 to 40 per cent of the affected animals show milder signs of the infection and about 20 to 30 per cent show no symptoms. However, regardless of severity, the abortion rate averages about 10 to 15 per cent. The abortions occur about ten to sixteen days following infection. The complement-fixation test, as described by York,[118] becomes positive in about two to three weeks. Recovered animals remain carriers for three months or more.

NONCONTAGIOUS INFECTIONS

Generalized infections are frequently found in the uterus and cervix. Fitch and Bishop[40] have found that the healthy bovine uterus is, in general, free of bacteria. However, bacterial infections may readily become established at or near calving time. Dystocia and retained after-birth may be important factors in establishing these infections. Calving in dusty or filthy surroundings may also play a part. DeCamp[30] has reported that metritis is most commonly caused by streptococci, staphylococci, *Corynebacterium pyogenes*, and *Escherichia coli*, all of which are commonly found around animals and in filth. Aziz-Ud-Din[6] states that purulent metritis is practically always caused by *C. pyogenes* either alone or in mixed culture. Easley *et al.*[34] found uterine infection in 80 per cent of the repeat breeding cows. *Micrococcus pyogenes* was the predominating organism found. Lindley and Hatfield[70] recovered 26 separate species of bacteria from the uterus of infertile cows. Predominant among these were micrococci, Neisseria, and Corynebacterium organisms. Skaarup Thygesen[96] found inflammation in the uterus or salpinx of 67 of 700 cows examined (9.6 per cent); 61 of these were caused by *C. pyogenes*. The extent to which metritis has been incriminated as the cause of infertility varies from 6 to 53 per cent.[33,81,109]

The treatment of metritis cases must of necessity vary according to severity and individual cases. In purulent metritis, the pus may be removed by expressing a corpus luteum or by injecting an estrogenic hormone. Lundgren[72] has reported good results in treating purulent endometritis with stilbestrol. He treated 60 cows and 54 of them responded favorably and became preg-

nant after an average of 1.5 services per cow. Recent reports[15] indicate that estradiol cyclopentylate (E.C.P.) may be somewhat more reliable than stilbestrol for inducing estrus in cattle.

For repeat breeder cows suspected of having low grade, chronic uterine infections, Chambers[20] has reported the successful use of 200,000 units of penicillin in 15 ml. of water injected into the uterus. Woelffer[117] treated 29 cows with either 3.5 per cent of Lugol's solution or an aqueous solution of tyrothricin (Wallace) by injecting 100 ml. into each horn of the uterus five to eighteen days following estrus. Of 75 cows left untreated, only 22 per cent conceived, whereas 62 per cent of the treated cows conceived. He believed that the tyrothricin was slightly more effective and caused less straining than the iodine solution. Herrick[59] examined at slaughter 3 heifers and 1 cow, from different herds, which had exhibited normal estrous cycles but had been serviced three or more times without conception. No gross pathology was evident but bacteriological cultures of the uterus revealed micrococci, streptococci and Pseudomonas infection. He then treated 78 cows, of similar history, by injecting 1 Gm. of streptomycin and 400,000 units of penicillin in 25 ml. of 3 per cent sodium citrate into the uterus during the first stages of heat. Nearly 68 per cent of the cows conceived at the first service following treatment.

Pathological Alterations in the Oviduct.—Lombard *et al.*[71] found pathological alterations in the oviduct in 14.3 per cent of 154 repeat breeder cows. Chronic interstitial salpingitis, hydrosalpinx, and pyosalpinx were found in that order of descending frequency. Williams[115] found tubal pathology in 15.3 per cent of the cows having genital lesions. About half of the tubal abnormalities involved adhesions of the fimbria. Thygesen[104] found adhesions in the ovarian region of 8.7 per cent of 1,614 genital organs examined at slaughter. Rowson[94] examined 296 reproductive tracts and found adhesions of the ovarian bursa in 13.3 per cent.

Noninfectious Diseases

ENDOCRINE DISORDERS

A great deal of information has been accumulated by endocrinologists in the past fifty years. Many endocrine products are available and have been used in clinical practice to a great extent. However, as pointed out by Asdell,[3] there is a need for good assay methods so that hormone levels may be determined in individual cows and more carefully controlled experiments should be conducted.

Nymphomania.—Nymphomania (insane sexual desire) is associated with failure of ovulation and the formation of large cystic follicles in the ovaries. Such cows have heat periods at less than sixteen-day intervals and may remain in more or less constant heat. If the condition continues for several months, the tail head frequently becomes elevated and the animal may bellow like a bull. The exact cause of these cystic follicles is not known. However, it is thought to be due to a deficiency in secretion of luteinizing hormone by the anterior lobe of the pituitary gland. Casida *et al.*[19] treated 81 cows, showing symptoms of nymphomania, with intravenous injections of a sheep pituitary extract; 88 per cent of these animals recovered from the symptoms and of 53 which were bred, 68 per cent conceived. They found 13 cows which had cystic ovaries without showing nymphomania. Moore[77] treated 18 cows which had cystic ovaries with intravenous injections of an aqueous solution of chorionic gonadotropin, and 67 per cent showed improvement in eleven days with only 2 animals having a relapse. Eight were treated a second time with 7 recoveries. Of the 18 cows, 17 experienced normal cycles following the first or second treatment and 12 were known to have conceived. Lentz[66] injected 17 cows with folluetin (Squibb) and reported 16 conceptions.

Casida and Chapman[14] have reported that the heritability for cystic ovaries is about 43 per cent. In other words, in 43 per cent of the cases, the condition appears to be inherited. Wayman and Asdell[112] have found that nymphomaniac cows have significantly higher plasma protein levels, especially *gamma* globulin. Garm[44] has found evidence that the masculine behavior of "buller" cows is due to adrenal virilism and should not be considered the same as nymphomania.

Ovarian Hypoplasia.—This condition may affect one or both ovaries. Gilmore[46] cites studies by Lagerlöf and Eriksson in which the left ovary was affected in 82.3 per cent of the cases, the right ovary in

3.3 per cent, and both ovaries in 14.4 per cent. The condition was shown to be inherited. If both ovaries are affected in heifers, the genitalia remain underdeveloped and the animals do not come in heat. Such animals have been successfully treated by injecting gonadotropic hormones; however, due to the genetic implications, the advisability of treatment is questionable. Asdell,[3] in an excellent review of the use of hormones in the treatment of sterility, summarized six references regarding the use of gonadotropic hormones for the treatment of infantile ovaries, and of 78 heifers treated, 55 per cent became pregnant. Casida *et al.*[18] found that calves whose ovarian follicles had not developed antra failed to respond to pituitary extracts. They also found that superovulations are common and that the eggs shed have a poor capacity for fertilization. Asdell[3] also summarized three experiments in which 43 cows were treated with estrogens and 40 per cent conceived.

Ovarian hypoplasia may also occur in adults. The cause is not clear; it may be associated with malnutrition. Clark[24] treated 15 cows by ovarian massage one to four times, and 14 of them became pregnant after an average of 1.9 services. Asdell[3] again summarized 11 references and found that of 165 cows treated with chorionic gonadotropin, 50 per cent conceived. He also summarized 9 experiments in which 123 cows were treated with estrogens and 53 per cent conceived. Staheli, as cited by Asdell,[3] treated 51 cows by transplanting one or two ovaries; 85 per cent came in heat and 61 per cent conceived.

Persistent Corpora Lutea.—Persistent corpora lutea are frequently diagnosed. However, it is not always certain that the corpora lutea found on examination are abnormally persistent. When persistent corpora lutea are found, it is not always clear whether the persistency is due to malnutrition, uterine infections, embryonic deaths, or endocrine disorders. The usual treatment consists of squeezing the corpora lutea off of the ovaries by rectal manipulation. Clark[23] removed the corpora lutea from 62 cows and heifers; 70 per cent came in heat within ten days and 96.6 per cent became pregnant after one to four services. Herrick[58] removed the corpora lutea from 36 cows and 80.6 per cent came in heat within two to seven days. He treated 58 cows with 25 mg. of stilbestrol and 82.8 per cent came in heat within two to seven days. He did not report on the fertility.

Although there is some danger of fatal hemorrhage or trauma of the ovary with adhesions, Tischhauser,[105] citing experience with several thousand cases, states that expressing the corpus luteum is a safe, simple, and effective treatment. Hancock[53] autopsied a few cows after enucleation of the corpora lutea and failed to show any real evidence of incidental trauma. As stated by Williams,[114] when the corpus luteum is retained because of a mummified or macerating fetus or pyometra, the lutein mass tends to sink toward the center of the ovary and becomes encapsulated. In such cases, it may be more difficult and, therefore more dangerous, to express the corpus luteum by rectal manipulation. Estrogenic hormones may be preferable. Gibbons[45] has reported that injections of estradiol cyclopentylate (E.C.P.) compare favorably with the removal of the corpus luteum in percentage of estrous cycles induced.

Cystic Corpora Lutea.—Cystic corpora lutea were found in 4.2 per cent of the cases reported by Udall *et al.*[109] The cause of this condition is not known. Asdell *et al.*[4] have reported that the presence of a pool of fluid in the corpus luteum is a frequent phenomenon of no apparent physiological significance. As Williams has stated,[116] the ovary may be considered normal when it is capable of maintaining a normal estrous cycle. The treatment for cystic corpora lutea is the same as that discussed under persistent corpora lutea.

Delayed Ovulation.—Many cows have fairly regular heat periods, yet persistently fail to conceive when bred. It is frequently difficult to make a conclusive diagnosis in these cows. Some believe that delayed ovulation or failure of ovulation is the cause of infertility in some of these cases. Practitioners have used injections of estrogenic hormones (dienestrol) given during the early stages of heat in the belief that this will increase the liklihood of ovulation as well as speed up the process. Results of controlled studies do not appear to be available. Hansel and Trimberger[54] have shown that the subcutaneous injection of 5 to 10 mg. of progesterone during the first two hours of heat hastens the ovulatory process in dairy heifers. However, it is not known whether this treatment causes an adverse effect on sperm transport.

ANATOMICAL DEFECTS

Freemartins.—The freemartin condition is probably the best known anatomical abnormality. A freemartin may be defined as an imperfectly sexed heifer born twin with a bull. Only about 1 out of 12 heifers born twin with bulls are fertile.[102] Swett *et al.*[102] have found a wide range in the degree of sexual abnormality. They studied 17 freemartins and found some with male gonads, some with modified female genitalia, and some in which the female organs were almost absent. Lillie[69] has presented evidence which indicates that the freemartin condition is caused by fusion of the chorions and anastomosis of the blood vessels with resultant intermixing of blood. Moore[76] has shown that the humoral substance is probably not a steroidal sex hormone but may be a chemical substance produced by somatic cells of the genetically determined male. Goss[48] has pointed out that the ovaries, uterus, and anterior two-thirds of the vagina develop from mesoderm, while the vulva and posterior one-third of the vagina develop from ectoderm. This may explain why the ovaries, uterus, and anterior vagina are most severely affected. The vagina ends much as if a ligature had been applied anterior to the urethral opening. For diagnosing the freemartin condition, he recommends passing a 12 in. by 0.5 in. to 0.75 in. glass speculum. If there is no cervix and the vagina is only one-third of the normal length (2 to 3 in.), the animal is considered a freemartin. Swett *et al.*[102] reported that after one month of age mammary gland development was definitely retarded. The greatest retardation occurred at 4 months of age. They also noted that the clitoris is frequently enlarged and that there may be a fold of skin containing a cord which extends from the rear udder attachment to the navel. According to Gilmore,[47] about 1 per cent of the births in dairy cattle are twins and about half of the twins consist of one male and one female.

Persistent Hymen.—This condition occasionally occurs as a thin membrane blocking the vagina just in front of and above the urethra. In some cases, it may be imperforate and cause difficulty at the time of breeding, in addition to causing an accumulation of utero-vaginal secretions. There may be pyogenic infection and large accumulations of pus in some of these cases. Williams[114] advises against breeding animals with persistent hymen due to the danger of hereditary transmission.

White Heifer Disease.—In white heifer disease, according to Boyd,[14] the uterine horns are usually tubular, but oval or spherical, thin-walled sacculations may occur. The cervix is either imperfectly formed or absent and the vagina is extremely short and narrow. There is almost complete stricture just anterior to the urethra. The Mullerian ducts are persistent and are recognized as two small, hard, fibrous tubes contained within a common capsule extending along the floor of the vagina and uterine horns. There may be an accumulation of fluids in the uterus which may be mistaken for pregnancy. Spriggs[99] describes three types of affliction, among which is uterus unicornis, and states that the condition is most common in white or roan milking Shorthorns and that it appears to be hereditary. Dimitropoulos[32] reported on 12 cases found among 3,315 animals bred artificially and concluded that the condition was congenital in nature and due to a recessive hereditary factor.

Underdeveloped Genital Organs.—Arrested development of the genital organs may occur as an inherited characteristic. Close family breeding of animals carrying this factor may result in a large number of animals showing various degrees of abnormality. Fincher and Williams[39] recorded a case in which a sire was mated to his daughters for three successive years. Fifty-six per cent of the heifers born were completely sterile and 13 per cent were virtually sterile, while the remaining 30 per cent were of low fertility. Common abnormalities found were uterus unicornis, atresia of one or both horns at the base, double uterus, double cervix, and fibrous bands over the cervix.

Tumors.—Malignant tumors of the ovary and vagina have been reported by Williams,[114] but he states that they are rare. Bradbury and Ricker[16] reported a 21-lb. ovarian tumor in a cow showing symptoms of nymphomania. The structure of the tumor was suggestive of a granulosa cell carcinoma. Ingmire[61] found a squamous cell carcinoma on the lip of a cow's vulva. Langham and Clark[65] found a granulosa cell tumor in the ovary of a 2-year-old heifer. The tumor was characterized by numerous, irregular follicle-like structures either spherical, ovoid, or cylindrical in shape.

Kingman and Davis[64] also reported a 23.5-lb. granulosa cell tumor on the ovary.

Benign tumors have been reported in the ovary, uterus, and vagina by Williams,[114] but he states that these, too, are rare.

NUTRITIONAL DEFICIENCIES

Reid[91] and Asdell[2] have thoroughly reviewed the literature regarding the relationship of nutrition to fertility. Since reproductive functions are conditioned by a long series of physiological events in which the body as a whole, as well as the sex organs, is concerned, it is self-evident that nutrition must play at least a general role in the development and functioning of the reproductive organs.

Underfeeding and Overfeeding.—Underfeeding delays puberty in both the male and female. Eckles *et al.*[35] found that heavily fed Jerseys and Holstein-Friesians came in heat seventy-six and 112 days, respectively, before heifers on a low plane of nutrition. Richter[92] has reported that a low nutrient supply in mature animals results in irregular heat periods and failure to conceive.

Overfeeding may also affect fertility. Hansen and Steensberg[55] divided 238 Red Danish heifers into three groups at 16 days of age and fed them at high, normal, and low nutritional levels until they had their first calves. The heifers were then kept under similar conditions until all their lifetime records had been completed. The group fed on the high plane of nutrition had fewer calves and a higher percentage of culling due to infertility than either of the other two groups. The manner in which overfeeding caused the infertility was not determined. Whether fatness in itself is a cause of infertility is not known.

Underfeeding is generally associated with poor quality feed; thus an energy deficiency is often accompanied by deficiencies in protein, vitamin A, phosphorus, and perhaps other nutrients. When the protein intake is deficient in rats, estrus and ovulation fail to occur.[85] Cole *et al.*[25] have produced ovulation in protein-deficient rats by administering pituitary substances. Courrier and Raynaud[26] found that the pituitary glands of such rats were smaller and produced less ovarian response than normal glands. Whether this sort of process occurs in cattle is not known. Hart and Miller[57] have shown that limited protein intake has little effect on the fertility of sheep.

Vitamin Deficiencies.—Hart and Guilbert[56] have reported that vitamin A deficiency in cattle may result in abortions during the second half of pregnancy, calves born weak or dead, retained after-birth, and failure to come in heat. Other symptoms shown by the affected animals were lacrimation, ophthalmia, occasionally blindness, anorexia, and diarrhea.

Gullickson *et al.*[50] fed vitamin E-deficient rations to 8 bulls and 22 heifers throughout their lifetime. Reproductive organs developed normally in both sexes and growth was normal. The bulls produced high quality semen and the heifers experienced normal estrous cycles. A total of 30 services produced 25 conceptions but only 19 of these terminated in normal parturitions since 6 cows died suddenly from heart failure one to three months before they were due to calve. Since vitamin E is plentiful in natural feeds and since no vitamin E requirement has been demonstrated for cattle, there is little need for further discussion here. Regarding wheat germ oil, many case histories have been cited as indicating beneficial results. However, large scale controlled studies are lacking. At any rate, if wheat germ oil does improve fertility it is probably not due to the vitamin E content. Wheat germ oil has been shown to have estrogenic, androgenic, and gonadotropic effects.[67]

Phillips *et al.*[86] have reported that normal cows show an increase in plasma ascorbic acid during the period from mid-to-late estrus, whereas hard-to-settle cows did not manifest this increase. After treating 17 cows with ascorbic acid, these workers concluded that about 60 per cent of the hard-to-settle cows respond. Christian *et al.*[21] studied 116 repeat breeder cows and found that 5 Gm. of chlorobutanol fed daily caused an increase in the ascorbic acid level of the blood plasma, whereas 3 Gm. of ascorbic acid subcutaneously every other day failed to maintain an increased level. They found no evidence that ascorbic acid stimulation was beneficial in increasing fertility of the cows.

Phosphorus Deficiencies.—Observations in phosphorous-deficient areas throughout the world are in agreement that reproductive troubles are common and that they have caused large losses in livestock production.

Phosphorus deficiency tends to occur when the soil is definitely deficient, when the feed is low in protein, during dry seasons, or when cows are milking heavily without adequate protein or mineral supplement. Generally, reproduction does not suffer until the animal shows definite symptoms of phosphorus deficiency such as unthriftiness, rough coat, and depraved appetite. However, Black *et al.*[11] were able to diagnose aphosphorosis by inorganic phosphorous determinations of the blood even before actual physical symptoms became apparent. These workers studied 100 heifers pastured on phosphorus-deficient soil; 25 heifers were kept as controls while the others were given various mineral supplements, all of which contained phosphorus. Based on a two-year average, only 64 per cent of the control cows produced calves as compared with 85 per cent for those fed supplements. Only about 30 per cent of the control cows calved in two consecutive years, whereas the supplement-fed cows averaged about 73 per cent. Eckles *et al.*[36] have shown that affected cows tend to have one or two heat periods after calving. If they conceive at this time, they usually carry their calves to term. If not, the cows tend to remain out of heat for the remainder of their lactation, but after being dried off they usually come into heat.

Trace Minerals.—Bentley *et al.*[10] have reported evidence that trace minerals have little if any direct relationship to the repeat breeding cow problem.

High-Producing Cows.—Lewis and Horwood[68] and New Zealand workers[1] have reported evidence that cows producing at high levels are inclined to have lower fertility. However, Gaines[43] and Boyd[13] found that level of production had no significant effect on fertility.

GENETIC DEFECTS

Gilmore[46] has thoroughly reviewed the literature with regard to the inheritance of reproductive inefficiency. He cites evidence that white heifer disease, ovarian hypoplasia, incompletely developed uterine horns, adolescent infertility, lack of gonads, testicular hypoplasia, and other abnormalities may be inherited. He also presents data regarding 26 inherited lethal characteristics.

Other studies of a more general nature have indicated that genetic factors are of importance in determining fertility. Jones *et al.*,[62] in reporting a study of the Oregon State College dairy herd covering a period of 25 years and including 368 cows of four breeds, concluded that the inheritance of low fertility and close-breeding practices might account for much of the infertility found in dairy herds today. Spielman and Jones,[98] in a study of the same herd, found a correlation of 0.546 ± 0.118 between the mean reproductive efficiency of foundation cows and that of their daughters. Käb[63] studied the records of 7,104 calvings and found that the daughters by 22 different bulls varied considerably as groups, thus indicating a genetic basis for the variation in fertility.

MANAGEMENT PRACTICES

Trimberger and Davis[106] have shown that highest fertility is obtained when cows are bred six to twelve hours after the beginning of heat. However, under farm conditions cows are not checked frequently enough to assure observing the first signs of heat. Trimberger[107] also found that the highest fertility is obtained when cows are bred six to twenty-four hours prior to ovulation.

VanDemark and Salisbury[111] and Olds *et al.*[82,83] have found that cows bred less than six weeks after calving have a markedly lower fertility than those bred two to four months after calving.

The age and size at which heifers are bred are important factors with regard to the economics of milk production. However, Olds *et al.*[84] have reported that age and size of heifers have very little or no effect on fertility. The minimum age of heifers studied was 12 to 14 months and the minimum size was 301 to 400 lb.

Due to the incidence of mixed infections in the genital tract and chronic metritis, it appears certain that proper care of cows at calving time is of the utmost importance.

MISCELLANEOUS FACTORS

Many reports have been made regarding the effect of age and season on fertility.[12,29,37,49,60,74,75,80,84,103,108] In general, highest fertility is obtained in December, whereas the lowest is obtained in August or September. Young bulls are uniformly reported as having highest fertility. Several reports have shown that young bulls have marked superiority over old bulls when bred to heifers.[12,60,80,103] Cows appear to have the highest fertility at about 4 to 6 years of age.

Mercier and Salisbury[74] have found a significant correlation between conception rate and average length of daylight in three Canadian herds. It seems that the short daylight hours are detrimental in high latitudes, whereas high temperatures are detrimental in low latitudes.

Roark and Herman[93] have summarized the information available on pH of vaginal secretions. Considerable variation has been found; however *in vitro* samples were generally alkaline and became less alkaline during heat. *In vivo* changes were not so marked; the secretions are less alkaline and may even be acid. There appears to be no relationship between vaginal pH and breeding difficulties.

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The Treatment of Certain Types of Sterility in Cattle with the Hormone, ECP®

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Hormonal imbalances, requiring the use of estrogenic substances to effect a recovery, account for a definite percentage of cases of sterility. On or about March 1, 1952, a new product possessing marked estrogenic activity, estradiol cyclopentylpropionate (ECP®),* was made available to the veterinary profession. Demands from many sources for information concerning this drug prompted a preliminary report of research conducted at the Storrs station.[1]

Additional data are now available and bear out the findings reported in the original release.

Other reports are available on the use of ECP in sterility of cattle,[2,3] horses,[4] sheep,[5] dogs,[6] and chinchillas.[7] These reports indicated that ECP possessed greater estrogenic activity than any of the estrogenic hormones previously available for use in sterility practice. The dosage for ECP recommended by the manufacturer is 5 mg. administered intramuscularly.

Presented at the Eighth Annual Short Course for Veterinarians, Abraham Baldwin Agricultural College and Georgia Costal Plain Experiment Station, Tifton, Ga., Oct. 13-14, 1952.

From the Storrs Agricultural Experiment Station, University of Connecticut, Storrs.

*ECP was provided by the Upjohn Company, Kalamazoo, Mich.

CLINICAL OBSERVATIONS

The observations which follow were made in four different dairy herds where the reproductive efficiency is under the surveillance of the authors. All of the dairy breeds with the exception of Brown Swiss are included and about two-thirds of the data accumulated are from treatment of animals of the Jersey breed.

Anestrus.—For the purpose of this report, anestrus refers to cases in which the animal has never been observed in heat or has not been observed in heat since parturition, sixty or more days previous, and in which rectal examination revealed a normal reproductive tract.

The data here presented include 41 cases of anestrus, as defined, which were treated with 3, 4, or 5 mg. of ECP intramuscularly. Of these, 80 per cent were observed in heat between two and eight days following treatment. Approximately 10 per cent of the cows that were brought in heat did not return a second time. Of those bred on the first normal heat which followed the heat produced by treatment, about 60 per cent conceived. This should be considered as a normal first service conception rate. Approximately 20 per cent of the cases of anestrus treated with 5 mg. of ECP showed extended heat periods and in nearly half of them it was necessary to resort to the injection of follutein® to return the animal to a normal cycle. Only occasionally would one of the extended heat cases actually become cystic. The lower dosages did not cause nearly so high a percentage of extended heats.

From these results, it is the authors' conclusion that a dose of 3 to 4 mg. of ECP is adequate and safest in the management of anestrus. The data concerning anestrus are presented in table 1.

TABLE 1—Effect of ECP on Anestrus

Cases	Dose	Heat observed	Response failure	Response (%)
10	3 mg.	3 to 7 days	2	80
17	4 mg.	2 to 8 days	2	88
14	5 mg.	2 to 7 days	4	71

Retained Corpus Luteum.—For the purposes of this report retained corpus luteum (c.l.) refers to cases which have been observed in heat since parturition but which have failed to return to an observed heat in forty-five to sixty days. Included also are

cases found nonpregnant on rectal examination forty-five days or longer following the last service. Rectal examination revealed the tract to be otherwise normal. It must be admitted however, that this group undoubtedly also includes cases for mere failure to observe heat and early undetected abortions.

The data here presented include 65 cases of retained c.l., as defined, that were treated with 3, 4, or 5 mg. of ECP intramuscularly. Of these, 75 per cent were observed in heat between three and eight days following treatment. The percentages for the three doses were 59, 89, and 82, respectively. This would indicate that the 3-mg. dose should be considered inadequate. Slightly less than 10 per cent of the cows that were brought in heat did not return a second time. As in anestrus, animals bred on the first normal heat, which followed the heat produced by treatment, showed a normal conception rate. Of the 11 cases in which 3 mg. of ECP did not elicit a response, 8 were brought in heat by a dose of 4 mg. administered seven days later. Persistant heats and cystic ovaries were again observed following treatment, but the percentage was only about half of that which occurred in treated anestrus cows. Probably this was due to the presence of a normal functioning c.l. in some of the animals that were misclassified as retained c.l. cases.

From these results, it is the authors' conclusion that a dose of 4 mg. of ECP is adequate and safest in the management of retained c.l. The data concerning retained corpus luteum are presented in table 2.

TABLE 2—Effect of ECP on Retained Corpus Luteum

Cases	Dose	Heat observed	Response	failure	Response(%)
27	3 mg.	3 to 7 days	11		59
27	4 mg.	3 to 8 days	3		89
11	5 mg.	3 to 8 days	2		82

Miscellaneous.—Although ECP has been used by the authors in the treatment of silent heat, pyometritis, mummified fetus, and retained placenta, an insufficient number of case histories is available from which to draw any definite conclusions. In all of such cases it was apparent that the drug was at the least the equal of any estrogenic substance previously employed.

CONCLUSIONS

Intramuscular injection of the hormone ECP is probably the most effective method now available for inducing heat in cattle even though in some cases a normal cycle is not reëstablished. This product seems to have considerable value, particularly in the treatment of anestrus and retained corpus luteum. Cases of pyometra, silent heat, mummified fetus, and retained placenta may also respond to ECP treatment.

A relatively high incidence of persistant heats has been observed following intramuscular injections of ECP, but it is doubtful that the incidence exceeds that caused by other effective estrogenic substances commonly employed.

It is believed that in the management of anestrus or of retained corpus luteum, in the average cow, that the recommended dosage of 5 mg. should be reduced to 4 mg. The 4-mg. dose is equally effective and the percentage of side reactions is noticeably lower.

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Chilling and Overheating Chicks.—Experiments at the University of Maryland indicate that chickens can survive an extreme drop in body temperature but not much of an increased temperature. Their normal temperature is 106 to 108 F., yet neither an embryo nor a mature hen can withstand a body temperature of over 117 degrees. On the other hand, a mature hen can survive an internal temperature of 70 F., a baby chicken 58 F., and an embryo 30 F. However, no chilling can be tolerated except for a relatively short period of time. —*World's Poult. Sci. J., Oct., 1952.*

Methadone, Scopolamine, and Nembutal Anesthesia in 15 Dogs

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Methadone hydrochloride is one of the newest morphine substitutes to receive wide acceptance.[1,2] As a preanesthetic sedative, it equals morphine in analgesic action. In its lack of side reactions, it betters the performance of morphine. Methadone produces no euphoria, no vomiting, and much less salivation than morphine. It may be administered intravenously with no excitement stage.

Scopolamine[3] (hyoscine hydrobromide) has long been used as an adjunct to morphine. A member of the atropine family of alkaloids, it acts in therapeutic doses to accentuate the analgesic action of morphine and morphine-like drugs, check excessive salivation, and stimulate the respiratory center and heart.

Table 1 shows results in a series of 15 dogs which were anesthetized for routine surgical procedures encountered in small animal practice, using methadone and scopolamine in combination with nembutal.* Dr. C. E. Bild[3] brought methadone to my attention in a private communication, reporting he had employed it in doses of 1 mg. per pound of body weight combined with 1/200 mg. of scopolamine for a 20-lb. dog, with nembutal to effect, in dogs that were poor surgical risks because of age. I adopted his figures as a starting point, but in subsequent cases the dosage was varied within the therapeutic limits of the two drugs.

The smallest dose of methadone used was ½ mg. per pound in dog 11, a 60-lb. Pointer. Less than that would, in many timid or hysterical dogs, fail to alleviate the fear which often produces an excitement stage. My largest dose was a full 1 mg. per pound in dog 12, an 11-year-old Cocker Spaniel. Scopolamine, 1/200 gr., was adequate for any but the largest breeds. When that figure was appreciably exceeded, even in dogs up to 50 or 60 lb., respiration was too quick and shallow.

Nembutal must be handled with extreme care when used in this combination. My doses varied from ½ to ¼ of the ordinary

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*Nembutal is a trademark of Abbott Laboratories in Chicago.

TABLE 1—Results of Methadone—Scopolamine—Nembutal Anesthesia in 15 Dogs

Dog	Breed, weight, age	Operation	Dose methadone	Dose scopolamine	Dose nembutal	Time int. between methadone & nembutal
1	Mixed Terrier 19 lb., 6 yr.	Set fractured tibia	15 mg.	1/200 gr.	1 gr.	5 minutes
2	Cocker Spaniel 20 lb., 6 mo.	Spay	15 mg.	1/200 gr.	1 gr.	2 hours
3	Mixed Terrier 30 lb., 1 yr.	Spay	20 mg.	1/200 gr	1½ gr.	3 hours
4	Mixed Shepherd 25 lb., 6 mo.	Spay	15 mg.*	1/200 gr.	2½ gr.	2 hours
5	Mongrel 28 lb., 1 yr.	Spay	20 mg.	1/200 gr.	1½ gr.	5 minutes
6	Boxer 50 lb., 1 yr.	Repair ear trim	30 mg.*	1/150 gr.**	4 gr.	1 hour
7	Mongrel 20 lb., 3 yr.	Insert pin, broken jaw	15 mg.	1/200 gr.	1¼ gr.	30 minutes
8	Collie 38 lb., 5 mo.	Spay	20 mg.*	1/200 gr.	4 gr.	4 hours
9	Collie 45 lb., 7 mo.	Spay	30 mg.*	1/150 gr.	3 gr.	2 hours
10	Irish Setter 25 lb., 3 yr.	Spay	20 mg	1/200 gr.	3 gr.	45 minutes
11	Pointer 60 lb., 4 yr.	Debark	30 mg.*	1/100 gr.**	3½ gr.	No int.
12	Cocker Spaniel 30 lb., 11 yr.	Cystotomy	30 mg.	1/200 gr.	1 gr.‡	5 minutes
13	German Shepherd 50 lb., 3 yr.	Intra. pin femur	40 mg.	1/100 gr.**	1 gr.	45 minutes
14	Boxer 20 lb., 3 mo.	Trim ears	15 mg.	1/200 gr.	1½ gr.	No int.
15	Collie 40 lb., 10 mo.	Cesarean section†	30 mg.	1/200 gr.	1¼ gr.	15 minutes

*Too little methadone, not enough sedation. **Too much scopolamine, dogs panted during surgery. †After eight hours labor, pups already dead. ‡Too little nembutal, not enough sedation.

1 gr. to 5 lb. of body weight, considered normal for nembutal used alone. The injection was discontinued at the point at which the wink reflex was markedly weakened but not completely absent. At this point, too, pinching the interdigital web produces a muscle twitch not strong enough to move the limb. In only one case, dog 12, a Cocker Spaniel, did these signs fail, and I was forced to supplement with ether during the operation.

In every instance, methadone was injected first, then scopolamine, then nembutal, all intravenously. The last two drugs were always given in close succession, using the same needle although not the same syringe. I dissolved soluble scopolamine tablets in 10 cc. of isotonic saline solution. The time interval by which the methadone preceded the other drugs varied from two or three minutes up to four hours. As the dogs were presented for surgery, methadone was injected and the dogs were placed in cages to wait until time for surgery. There were no obvious variations in response due to time interval.

Veterinarians accustomed to using barbiturates alone will notice a marked difference in the respiration of dogs well relaxed by this combination of drugs. The deep, soft, slow breathing we see under barbiturates alone is missing. The patient breathes with the same rapidity and depth as when awake. In no case was respiratory weakening observed that warranted the use of oxygen. None of the dogs received any chemical respiratory stimulants.

Recovery time is shorter than in nembutal anesthesia, but it is not as short as with any common inhalation anesthetic. All the cases shown in table 1 were able to lift their heads within two hours. Most were standing by that time.

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When Moving, Advise the AVMA

Traumatic Reticulitis

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The postsurgical history of 100 cows operated on for removal of foreign bodies is reported. This report includes most of the cases in which the author participated either with the surgery or the after-care or both during the year 1951-1952 (87) and a few similar cases operated on with colleagues during the first eight months of 1952 (13).

We have a four-man partnership* engaged primarily in dairy practice. Since two men assist each other on each of these cases, this report represents a little over half of the cattle operated on in our practice during this time. The others are not included because of the increased difficulty in accumulating their case histories. However, the data on them would not vary appreciably.

The large number of cattle operated on in our practice area is a result of many factors, including (1) an extensive dairy practice where return to production is usually more practical economically than salvage for beef; (2) clients who call sufficiently early to present a large percentage of good surgical risks, which also means early enough so the foreign body may be recovered before it has penetrated the reticulum; (3) speed of surgery, by the veterinarians, with a minimum of return calls to allow a fair fee at a practical price to the dairyman; (4) high degree of accurate diagnosis on the first call. This latter point is important as this is how the confidence of the farmer is gained.

Many cows recover from one or more foreign body attacks without any later attacks. If the veterinarian is not always alert for "wire cows," many cases will be treated as indigestions of one form or another and may recover rapidly or may become "tough indigestion" cases. It is not unusual to go out and diagnose a typical wire indigestion, return to the clinic for assistance or to wait until the next day, only to find a well cow on return. Undoubtedly, if we waited an extra day, or more, before surgery, fewer cows would require surgical intervention—but a much higher

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*The two senior veterinarians in our practice, Dr. Carl Hjort and Dr. H. E. Warsinske, have been doing this type of surgery routinely for many years.

mortality would probably occur in the cases which later were operated on. We do not operate on well cows, but neither do we wait to see if they will get well without surgical treatment.

DIAGNOSIS

Diagnosis is made on the basis of clinical observation and history exclusively. By far the most significant symptom is the typical "wire grunt." Once the diagnostician can recognize this when he hears it, the other symptoms are of less importance but should be carefully considered. Nine out of 10 such cases can be forced to emit this typical

TABLE I—Summary of 100 Surgical Cases of Traumatic Reticulitis

No. of cases	Complications	Days for recovery	Treatment & day given	Ave. days preop.	Ave. inch penetr.	Production(%)	Comments
7	None	½ to 2	None	0.7	0.5	100	.....
20	None	3 or 4	None	1.3	0.7	100	.....
16	None	5 or 6	None	1.9	0.75	100	.....
11	None	7 to 9	None	2.2	1.0	98	.....
1	None	5	None	7.0	2.0	100	.....
1	None	7	None	10.0	1.5	0	Went dry before operated.
1	Peritonitis	3	Sulfa, 2	0.5	1.0	100	.....
9	Peritonitis	5 to 7	Sulfa, 2 or 3, or 5 & penicillin, 2	3.3	1.0	97	103 F. in 2 for 2 & 5 wk. with peritonitis exudate in 1.
8	Peritonitis	8 to 10	1 or 2 doses sulfa, 2 to 9; + penicillin to 1, 7	2.5	1.1	89	1 = 103 F. 2 wk. 1 = incision infec.
4	Peritonitis	16 to 21	Sulfa or penicillin every 2 or 3 days	2.0	1.0	89	2nd attack for 2; 1 had twins, ok 3 wk. later; 1 relapsed, 24 hr. after each sulfa treatment.
1	Peritonitis	30	Sulfa 3 times	3.0	1.5	70	Relapsed weekly.
1	Peritonitis	died	None	3.0*	through reticulum	0	Much peritonitis exudate, died 24 hr.
1	Peritonitis	died	Transfusion & sulfa, 5 & 9	15.0	2.0	0	Poor risk, thin & weak.
1	Peritonitis	4	Sulfa, 2; + terramycin 3, 4, 5	0.5	0.5	100	ok after 2nd dose of terramycin.
1	Peritonitis	6	Sulfa, 2 & 3; + terramycin, 5, 6, 7	3.0	through reticulum	80	3rd attack, 2-in. nail from peritoneal cavity
1	Peritonitis	8	Sulfa, 2 & 4, terramycin, 5, 6, 7	4.0	2.0	100	4th attack, no response to sulfa
1	Peritonitis & incision infection	10	Sulfa, 2 + terramycin, 3, 4, 5 & 9, 10, 11	2.0	1.5	80	Relapse day 9
1	Infection	30	Sulfa & penicillin twice terramycin, 26, 27, 28	1.0	0.5	0	Incis. infec. day 5, then no milk.
1	None	3	Terramycin, 2, 3, 4	2.0	3.0	100	3rd attack
1	Retic. abscess	7	Sulfa, 1, terramycin, 6, 7, 8	1.0	1.0	heifer	2nd attack in 30 days
1	Peritonitis & injury	killed	None	0.5	not found		Dog chewed wound open
1	Pericarditis	died	Sulfa & penicillin, 4	1.0	2.5	25	Sympt. day 7, died day 10
1	Pericarditis	died	None	4.0	3.0	50	Sympt. day 10, died day 15
2	Pericarditis	killed	Sulfa, 5 + penicillin to 1	1.5	2.5	28	Condemned by butcher day 10 & 14
1	Septicemia	died	None	0.5	2.0	0	Nail into spleen, died 1st day
1	None	7	Sulfa, 1	3.0	1.0	100	Very sick when operated
1	Abscess	5	None	1.0	loose	100	Sympt. due to abs. from previous attack
1	Abscess	5	Drain abs. later	1.0	1.0	100	2 gal. abs. 8 wk. later
1	None	21	None	7.0	2.0	25	Cachectic & no milk when operated
1	Incision reopened	5	Resutured, 14	3.0	1.0	100	Sutures removed too soon = day 6
1	Grunt cont'd.	7	Sulfa, 2	? wk.	through reticulum	100	Wire lost in adhes., relapse in 6 months; butchered

Sulfa = sulfathiazole or sulfamethazine, usually intravenously; penicillin = penicillin in oil; terramycin, intravenously; sympt. = symptoms or signs.

grunt which is produced as a result of the pain from perforation of the diaphragm by the foreign body or by the associated adhesions. Many cows will show this grunt when walking on the level but more often the practitioner has to force it from them. Squeezing on the back directly dorsal to the reticulum, or exerting pressure with the knee in the abdomen ventral to the reticulum, is often successful. The method most consistently effective is to stand the suspect with the front quarters down hill or in the gutter and squeeze on the back. Moving the patient around for several minutes often makes it easier to produce the grunt. With this typical grunt, the diagnosis is practically made. In our experience, pleuritis and peritonitis from causes other than foreign bodies (such as some cases of metritis) are about the only conditions that produce a confusing grunt and these can be easily differentiated.

Other signs which would suggest checking for the "wire grunt" are: a temperature 0.5 degree or more above normal (it is often normal or slightly subnormal); reduced rumination; slightly arched back; acute anorexia with variable appetite on succeeding days; milk flow dropping to one-half at the first milking, to one-fourth on the next, then fluctuating according to food intake.

SURGICAL TECHNIQUE

Our surgical technique is not markedly different from that used or described by others. It includes paravertebral procaine anesthesia and the use of a shroud to prevent contents of the rumen from escaping into the peritoneal cavity. At present, all cases are given 3 million units of penicillin in oil at the time of the operation. Instructions are left to report if the animal is not beginning to eat fairly well in two days, if improvement does not produce complete recovery by the seventh day, or if a relapse occurs. Sutures are removed by the owner in five or six days. Suture abscesses, which occur in about 1 of 4 cases, are allowed to resorb or to drain spontaneously.

Table 1 gives the pertinent facts concerning 100 rumenotomy cases. They are grouped according to the complications and the number of days required for recovery. "Treatment" indicates the drug and the postoperative day it was used. "Average days preoperation" indicates the average days the animals showed signs of illness before they were operated on. Average inches penetrated" indicates the average for the deepest penetration of the foreign bodies regardless of how many were imbedded. "Production (%)" is the average postoperative milk production in the current, or if dry the next, lactation compared with the previous production. (In 1 Jersey the production doubled.)

DISCUSSION

Foreign bodies which perforate the reticulum and penetrate 2 inches or more anteriorly usually will produce pericarditis and are almost always fatal. Perforation of a parenchymatous organ or an extensive peritonitis considerably increase the gravity of the prognosis. No other correlation of the prognosis to the depth of penetration was observed. No correlation of the incidence of foreign body symptoms to a cow's stage of lactation or gestation[1] could be found and, consequently, this data is omitted.

Accurate records were not kept, but an incorrect diagnosis was made in perhaps 2 per cent of the cases, resulting in finding no foreign body lesions. About 10 per cent of the cases were not diagnosed on the first examination.

Five cows in one herd of 25 were operated on in a thirty-day period.

The advent of terramycin in 1952 seems to have aided materially in speeding the recuperation of several cows. For example, the mortality was 8 in 87 cases operated on during 1951, and it dropped to 1 in about 70 cases during the first nine months of 1952. Since we feel that three intravenous injections of terramycin at twenty-four hour intervals should be given for effect, requiring three return calls, we usually use this therapy only after one or more sulfonamide injections have failed to produce the desired result.

SUMMARY

One hundred cases of traumatic reticulitis treated by surgical intervention, with 92 per cent recoveries, are reported. The average duration of clinical symptoms prior to surgery was slightly more than two days. Return to full feed and to at least 90 per

[1]This is noteworthy since many have observed that foreign body indigestion seems to occur most frequently shortly after parturition, as if the penetration had been accelerated by the straining.—ED.

cent of production usually took approximately six days. Postoperative return calls were required in only 39 cases; on the second day in 20 cases; third to fifth day in 13 cases; sixth or seventh day in 4 cases; fourteenth day in 1 case; and sixtieth day in 1 case. If the three-day terramycin treatment, used in 7 cases, were to be considered as one return call, the number of postoperative calls per case would be: one call for 21 cases, two calls for 8 cases, three for 6 cases, five to seven for 3 cases, and ten for 1 case. The days required for recovery roughly parallel the days of preoperative illness and the relative depth of penetration of the foreign body.

Artificial Breeding in Turkeys

Artificial insemination has increased the fertility for one turkey breeder from 50 to 85 per cent. It takes time but pays him well. The hens are inseminated every three weeks and a tom will produce enough semen at each "milking" for 2 to 5 hens. Poultry geneticists have used artificial breeding for fifteen years or more.—*Farm J., Feb., 1953.*

Ewes fed a two-thirds toxic dose of halogeton for four months were not affected except that some lost their lambs. A toxic dose causes a typical hypocalcemia which does not respond to calcium therapy.—*J. L. O'Harra, D.V.M., Reno, Nev.*

Cows in a Glendale (Calif.) dairy often develop cystic ovaries a few weeks after calving. Chorionic gonadotropin—5,000 units intravenously—usually brings them back to normal.—*R. V. Jessup, D.V.M., Glendale, Calif.*

Enterotomy in a Pony

Dr. G. H. Conner of Washington State College reports an operation on a nursing, 6-month-old, 150-lb. Shetland pony to remove an impacted mass from the rear colon. The pony had been treated four days. Recent movement of the mass had partially ruptured the colon, producing a 10-inch longitudinal tear in the serosal and muscular layers adjacent to the longitudinal band. An incision was made in the exposed mucosal layer to remove the fecal mass after which the entire rent was repaired with sutures. The right flank incision was closed, the pony given intravenous infusions plus streptomycin and penicillin for three days, and it was discharged the ninth day. —*Iowa State College Vet., No. 2, 1953.*

Prolapsed Rectum in a Dog

The rectum of an 18-month-old Dalmatian bitch was completely prolapsed. A mass of oat straw still in the rectum had apparently caused the straining. The straw was removed and the prolapse reduced but it recurred three times in four days. A laparotomy was then performed just posterior to the umbilicus. The colon was drawn forward and tacked there with three nylon sutures which caught the serosa and muscular wall and also passed through the abdominal wall to close part of the incision. These sutures were removed on the fourth day. Recovery was uneventful.—*Iowa State College Vet., No. 3, 1953.*

Effect of Progesterone on Time of Ovulation of Heifers.—Ovulation occurred earlier in dairy heifers given subcutaneous injections of 5 to 10 mg. of progesterone at the beginning of estrus. This also reduced the length of estrus and the time from the end of estrus to ovulation. It is suggested that progesterone produced by the ovary before ovulation normally plays a role in the release of the luteinizing hormone and in ovulation in the cow. These facts may be significant in understanding the deranged physiology of the nymphomaniac cow and in other types of infertility in farm animals.—*J. Dai. Sci., Jan., 1952.*

Ewes with pregnancy disease were given glycerol as recommended by British veterinarians (March, 1953, JOURNAL, p. 165) but apparently with little, if any, benefit.—*D. E. Jasper, D.V.M., Davis, Calif.*

Pentachlorophenol Not Poisonous

Pentachlorophenol, a successful wood preservative, is sometimes confused with pentachloronaphthalene which is one of the causes of x disease. After extensive trials at the Illinois Agricultural Experiment Station, the former produced no harm to livestock which came in contact with it.—*West. Livestock J., Feb. 5, 1953.*

CLINICAL DATA

Sporadic Bovine Encephalomyelitis

Studies on Pathogenesis and Etiology of the Disease

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DURING THE PAST thirteen years, there have appeared a few reports[1-3] concerning a disease of cattle referred to as sporadic bovine encephalomyelitis. McNutt[1] was first to describe the disease in the United States. His reports contain descriptions of the clinical nature of the illness and some of the pathological sequelae resulting therefrom. We have brought together from a review of earlier studies some of the pertinent information available in regard to the disease. In addition to these early observations, we are adding data collected on 22 outbreaks of bovine encephalomyelitis observed during the past four years.

It should be noted that sporadic bovine encephalomyelitis is not a new disease. It has probably been observed in cattle by many veterinarians but not always recognized as a specific disease entity. Comments in recent publications[4,5] indicate that some veterinarians have observed cases of sporadic bovine encephalomyelitis but have failed to make a definite diagnosis. In addition, reports have appeared on diseases such as "tropical pneumoenteritis of calves" observed in Brazil,[6] and "enzoötic paralysis of calves of undetermined origin" observed in France.[7] These diseases may actually be sporadic bovine encephalomyelitis since the clinical syndrome is similar. Inasmuch as the etiological agent was not determined, critical proof of the identity of these diseases with bovine encephalomyelitis can not be made a matter of record.

THE CLINICAL DISEASE

Definition.—Sporadic bovine encephalomyelitis is a specific and definitive disease syndrome of cattle. It is caused by a visible filterable virus identified as a member of the psittacosis-lymphogranuloma venereum group. The infection is characterized by a sudden onset with fever, anorexia, depression, inactivity, nasal discharge, excessive salivation, dyspnea, cough, and occasionally diarrhea. At this stage, recovery may occur or nervous symptoms may appear, often terminating in death. The mesenchymal tissues, particularly endothelial and serous lining membranes, show the greatest pathological changes.

Clinical Syndrome.—Data on the clinical syndrome have been derived from observation of 1,899 cattle during 22 outbreaks. Prodromal signs and symptoms were not observed so none can be described. The onset in calves occurred with fever (105 F. to 107 F.), anorexia, depression, inactivity, increased salivation, drooling and frequently a nasal discharge. Dyspnea and an associated cough were observed in approximately half of the sick animals. Diarrhea, mild or severe, was common, with watery, blue-gray stools. Within a few days, or at most two weeks, calves had difficulty in walking. They would first show a stiffness, with knuckling of the fetlock joints. They often staggered, circled, and fell with a retraction of the head into a position of opisthotonos. Finally, the limbs would become weak, with an apparent paralysis. Death occurred in most of these cases within five to seven days but in some instances not for a month. Emaciation was evident in calves that became sick but eventually recovered.

In some herds, a large number of calves would show the initial symptoms, but only a few would develop serious symptoms and then die. In some instances, in calves and

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Aided by a grant from the National Foundation for Infantile Paralysis.

adults, death occurred suddenly with no prodromal symptoms being apparent.

The occurrence of the disease probably was dependent on the age and the herd immunity. In general, calves under 1 year of age have been most susceptible but where the disease was probably newly introduced, the adult cattle also were involved.

GROSS AND MICROSCOPIC PATHOLOGY

Gross Pathology.—Autopsies were made on 16 affected animals.* Peritonitis, serofibrinous in nature, was found in all. Early in the illness free, yellow, watery fluid was found in the peritoneal cavity. Later, the exudate was thickened and formed a fibrinous net enveloping the omentum and covering the surfaces of the liver and spleen. Adhesive strands of fibrin, which could be broken with the fingers, attached the omentum to the spleen and liver, and the liver to the diaphragm. The spleen sometimes was enlarged.

A fibrinous pleuritis and a yellow, watery, pleural exudate often occurred. Pericarditis was seen in 7 animals, with the pericardium covered by a delicate fibrinous exudate similar to that seen in the pleural and peritoneal cavities. No constant pathological changes were found in other organs. The brain and cord were moderately edematous and the blood vessels over the surface of the brain appeared congested, but meningeal exudate was never observed. Lobular pneumonia was occasionally seen. Small nodules, about 2 mm. in diameter, were found on the surface of the kidneys of 2 calves. Other tissues appeared normal.

Microscopic Pathology.—The microscopic findings showed: (*a*) fibrinous serositis, involving the peritoneal, pleural, and pericardial membranes; and (*b*) a diffuse and marked meningo-encephalomyelitis. Perisplenitis is illustrated in figure 1A. An acute and subacute inflammatory cellular reaction, characterized by organization of the exudate, overlies the capsule of the spleen. Pleuritis is illustrated in figure 1B. Cellular reaction, resulting in a pleural exudate, is similar to the reaction found overlying the spleen.

The histopathological changes observed in the central nervous system were those of a diffuse inflammatory process extending from the cerebral cortex to the lumbar cord. Meningitis, encephalitis, and myelitis were constantly found in the central nervous system. The meningitis was intense, particularly at the base of the brain. The cellular damage, particularly to ganglion cells in the brain and to neurones in the spinal cord, was often intense. There was also an intense vasculitis. The endothelium of blood vessels showed proliferative changes; vessel walls were infiltrated with mononuclear cells, as a rule, but occasionally polymorphonuclear cells predominated. Considering the diffuse distribution of lesions and the intense vascular damage, it would appear that vasculitis was primary, and that neuronal damage was secondary, to the generalized vascular damage.

Minute elementary bodies have been found in mononuclear and polymorphonu-

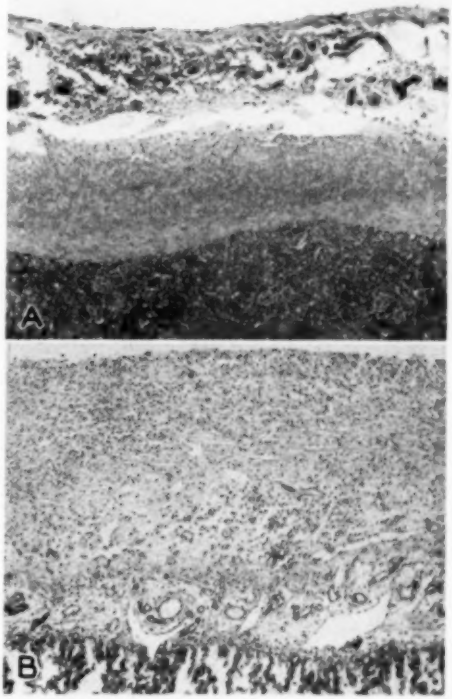

Fig. 1—(A) Organized capsular exudate, showing vascular proliferation, and organization of thrombi in capillaries. Spleen of calf 112. (B) Organizing fibrinous exudate, visceral pleura of calf 52934.

*We are indebted to Dr. Loren D. Kintner, assistant professor of veterinary pathology, University of Missouri, School of Veterinary Medicine, for notification of new cases and for obtaining fresh and fixed bovine tissues for experimental studies.

clear cells in the exudates overlying the mesencephalon and the spleen.

ENZOOTICITY AND HERD OUTBREAKS

Geographic Distribution.—Sporadic bovine encephalomyelitis has been observed in cattle in the midwestern and western United States. A survey of the published literature, and communication with state livestock sanitary officials and teachers in veterinary schools, have provided data appearing in figure 2. The disease has been recognized in 11 states, *i.e.*, California, Idaho, Indiana, Iowa, Kansas, Maryland, Minnesota, Missouri, Oklahoma, South Dakota, and Texas. Undoubtedly, the disease has a greater prevalence than is generally recognized. Clinical cases do occur sporadically, hence unless the syndrome is constantly borne in mind, the diagnosis may be missed.

Herd Histories.—During the past five years, 22 outbreaks of sporadic bovine encephalomyelitis have been observed and studied. Twelve of the affected herds were in South Dakota, eight were in Missouri, one in Kansas, and one in Oklahoma. A brief description of three of these outbreaks follows:

Herd J.R.M.—The first appearance of the disease on this farm in Linn County, Missouri, is unknown. Deaths began occurring among calves. One calf expired one day after birth in May, 1951, and another expired at birth in June.** On July 27, a 2-month-calf was found dead and a second calf was sick. It died in five days. A third calf became ill in August and a fourth in September. Each of the calves staggered, developed leg weakness, and an apparent paralysis, then died. On October 3, a fifth calf became sick and developed paralysis. When autopsied on October 5, it revealed a serofibrinous exudate in the peritoneal and pleural cavities. Tissues were taken for histological study.

Herd J.S.—This farmer in Audrain County, Missouri, handled only feeder stock. On Nov. 1, 1951, he purchased 64 calves (5 to 8 months of age) from local farmers. The newly purchased calves were kept isolated from 44 home-raised calves. On November 12, 2 of the new calves were dead, another was down, and all appeared sick. A diagnosis of "shipping fever" was made. The calves were given "hemorrhagic septicemia" antiserum and sulfonamides. All recovered within a few days.

**Serums from the dams of these calves obtained in October, 1951, contained no agglutinins for Brucella abortus.

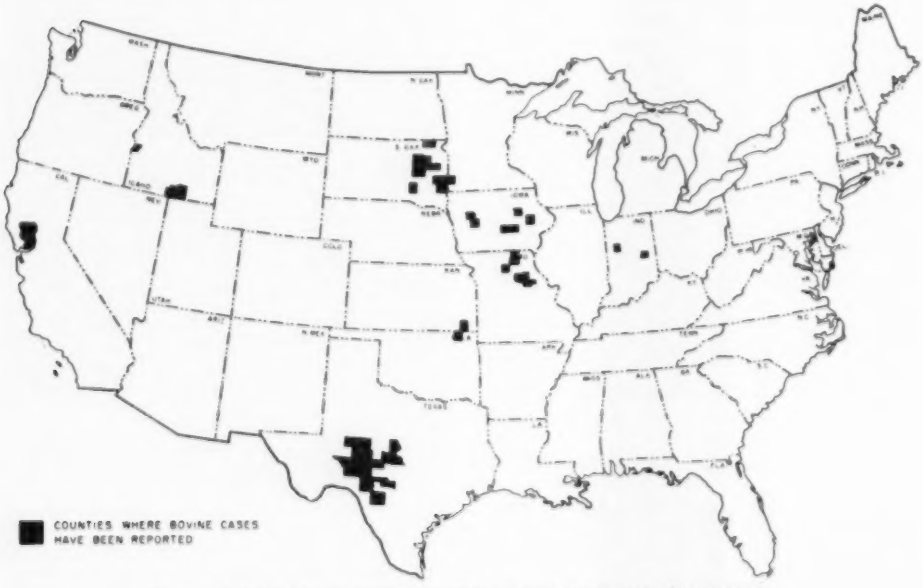

Fig. 2—Sporadic bovine encephalomyelitis in the United States (1940-1952).

In late November and early December, 5 of these calves showed signs of weakness, knuckling fetlock joints, ataxia, opisthotonos, eventually prostration, and 3 died. One was autopsied, revealing fibrinous pleuritis and peritonitis. Two killed and autopsied at the University of Missouri veterinary clinic also had fibrinous pleuritis and peritonitis.

None of the 44 calves raised on the premises showed signs of illness.

An infectious agent producing illness in guinea pigs and causing death of chicken embryos was detected in brain tissues obtained from 4 of the calves.

Herd C. L.—During the first week in October, 1949, C.L., a stockman in Moody County, South Dakota, purchased 40 head of feeder calves. On October 16, 1 of the calves had fever (104 F.) and was unable to rise. On October 20, another calf had a temperature of 106 F. and weak hind legs. The first calf was killed; the second recovered. No other clinical cases occurred. At autopsy (G.S.H.), a serofibrinous exudate was seen in the peritoneal cavity, covering the surfaces of the spleen and liver. There was also fibrinous pleuritis and pericarditis. An emulsion prepared from liver and spleen obtained from the first calf caused illness in guinea pigs and proved fatal for developing chicken embryos.

The duration of these herd infections appeared to be related to the incidence of immunity in the herd. The recruiting of susceptible calves into a herd where the etiological agent must have been present, but latent, was followed by abrupt and extensive outbreaks lasting two to four weeks. For example, in one herd (J.S.) the disease appeared on November 12, but after the middle of December, no new cases occurred. In another herd (M.C.), the disease appeared on March 7 when 5 cows became sick and 3 died, but after March 21 there were no new cases. In three herds, the disease apparently had a true sporadicity, for members of the herds became ill at intervals during a six-month period. In one such herd (C.A.B.), the disease appeared in June, with 14 calves and 2 cows becoming ill over a period of twenty-two weeks, the last calf dying early in November.

STUDIES ON ETIOLOGY

As stated earlier, minute elementary bodies were found outside of, and in, mononuclear cells of the exudate overlying the spleen and mesencephalon. The elementary bodies were minute, uniform, round structures found scattered singly in exudates, or present in clusters within the cytoplasm of macrophages and mast cells. They varied slightly in size, and stained a pink-red color with Macchiavello's stain.

The observations led to the studies which follow, inasmuch as it was evident that the agent belonged to the visible viruses of the lymphogranuloma-venereum group. One of us (G.S.H.) has adapted three strains of the agent to chicken embryos. It grew in the yolk sac and killed the embryo within five to ten days. In addition, each of these three strains caused a clinical illness in guinea pigs following inoculation of the

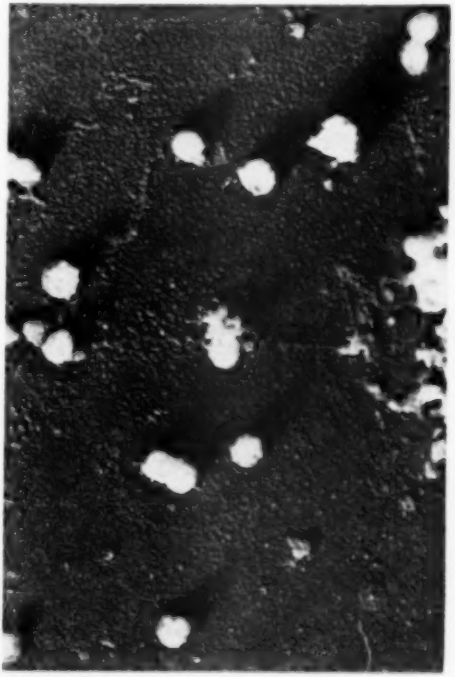

Fig. 3—Electron microphotograph of elementary bodies seen in experimentally infected yolk sac. Purified according to method of Topping and Shepard. Approximate size 375 mμ. Uranium shadowed.* Strain W. S. x 12,200.

*We are indebted to Dr. J. L. Melnick, Section of Preventive Medicine, Yale University School of Medicine, for making available the technical services of Miss M. J. Owen for the preparation of the electron microphotography, and for measurements of the virus.

virus into the peritoneal cavity. Inoculation of virus into guinea pigs caused fever (104 to 106 F.), weakness, emaciation, and sometimes death. If these guinea pigs were killed early, during the acute febrile response, there was a serofibrinous exudate in the peritoneal cavity similar to that observed in affected cattle, and elementary bodies could be demonstrated in the exudate. Moreover, the exudate gave origin to infection in embryonating chicken eggs. The spleen in infected guinea pigs was usually enlarged.

These preliminary studies provided us with the necessary tools to explore outbreaks further. At the present time, 12 strains of virus have been isolated from six affected herds. Some of the data in regard to these strains is to be published.[8]

DIAGNOSIS

When typical symptoms were observed and the animal developed an apparent paralysis before expiring, the diagnosis was not difficult to make. On autopsy, these animals invariably showed a serofibrinous peritonitis with or without pleurisy, findings which were pathognomonic. In many cases, however, the onset was sudden and death occurred within a few days. In such cases, the serofibrinous peritonitis or pleuritis was not found, so the diagnosis had to be based on the isolation of the etiological agent. The complement-fixation test was useful in confirming the diagnosis and in detecting cattle with inapparent infections. Smears of nasal discharge stained with Macchiavello's stain may also aid in making the diagnosis, since elementary bodies have been found in nasal discharges.

There are a variety of diseases that might be confused with sporadic bovine encephalomyelitis. McNutt mentions rabies, malignant catarrhal fever, and listerellosis.[9] In our experience, the disease has been most commonly mistaken for shipping fever and rabies. The history and early symptoms are in full accord with a diagnosis of shipping fever. In most cases, the disease follows the introduction of a new group of animals on the farm. The initial signs of fever, nasal discharge, and cough are also commonly ascribed to shipping fever. Sporadic bovine encephalomyelitis should, therefore, be considered when the shipping fever syndrome is observed.

When adult cattle show an increased salivation and drooling, the disease may be confused with rabies. In one herd (M.C.), in Monroe County, Missouri, virus was isolated from the central nervous system tissues of a 5-year-old cow. On March 8, 1952, a cow was found dead in the barn and 4 others in the herd of 25 were sick. Two of the 4 sick cows died twenty-four to forty-eight hours after onset. Two veterinarians suspected rabies encephalitis but Negri bodies were not found, and mice inoculated intracerebrally remained healthy for thirty days. From these tissues, bovine encephalomyelitis virus was isolated. A clinical diagnosis of rabies in cattle should always be confirmed by animal inoculation.

PROGNOSIS

Data from 21 herds observed is presented in table 1. There were 1,774 cattle in these herds. Of these, 892 were less than 1 year of age, 400 were 1 to 3 years old, and 482 were adult animals. Calves under 6 months of age were uniformly much more susceptible to the disease than older animals. Morbidity rates among older cattle averaged 5 per cent, whereas among calves the rate was 25 per cent. Although calves experienced the greatest herd mortality, the observed case mortality was only 29 per cent, while adult animals, when they did develop the disease, had a case mortality of 38 per cent. Yearlings had a case mortality of only 11 per cent.

TABLE 1—Summarized Morbidity and Mortality Data on 21 Herds* Affected by Sporadic Bovine Encephalomyelitis

Age**	Total	Herd No. sick	Herd morbidity (%)	No. dead	Mortality Herd(%)	Mortality Cases(%)
Adults	482	24	5	9	2.0	38
Yearlings	400	19	5	2	0.5	11
Adults and yearlings	882	43	5	11	1.0	26
Calves	892	224	25	64	7.0	29
Total	1,774	269	15	75	4.0	28

*Data concerning the twenty-second herd was incomplete and therefore was omitted.

**Calves, under 1 year; yearlings, 1 to 3 years; adults, 3 years and over.

PREVENTION AND TREATMENT

No effective preventive measures have been found for the control of sporadic bovine encephalomyelitis. Treatment appears to be possible, as indicated by preliminary laboratory experiments.

The therapeutic effect of penicillin, aureomycin, and terramycin on 2 strains of bovine encephalomyelitis have been studied in chicken embryos. Among those tried, aureomycin was the superior antibiotic. It prevented infection in chicken embryos, although a high dose of the drug (0.60 mg. or more per egg) was required. Terramycin and penicillin in the dosage used gave irregular results, preventing infection either in part or not at all.

Animals affected by the disease have been treated with sulfonamides, penicillin, terramycin, or aureomycin. The majority of the treated animals died, but some recovered. The data fail to provide convincing evidence that those which recovered had been helped by antibiotic therapy. Additional observations are necessary.

SUMMARY

Sporadic bovine encephalomyelitis is a specific and definitive disease syndrome of cattle. Calves less than a year of age are more susceptible to severe attacks than are older cattle. The disease apparently is more common in the midwestern United States but it may have occurred elsewhere as sporadic cases without being recognized.

Clinical and pathological observations indicate that the infectious agent primarily attacks mesenchymal tissues, among which the vascular tree and serous membranes bear the brunt of the attack. The encephalomyelitis is not primary but arises as an incident in a widespread invasion of mesenchymal tissues by the virus.

Minute elementary bodies may be found in tissues and exudates obtained from the carcasses of cattle dead from the disease. Tissues and exudates obtained from infected cattle will produce experimental infection in guinea pigs and in embryonating eggs. In the peritoneal exudate of the guinea pigs and in the yolk sac of the embryonating eggs, elementary bodies can then be demonstrated.

The appearance of specific antibodies in experimentally inoculated calves provides evidence that the agent is related to the disease in cattle. Its physical and serological characteristics indicate that bovine encephalomyelitis virus is antigenically related to the psittacosis-lymphogranuloma venereum group of viruses.

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"Flying Saucerosis" in a Calf

The following case is of interest principally because of the unusual clinical history provided by the owner. The patient, a female Hereford calf about 4 months of age, was still nursing and in a reasonably good state of nutrition. The owner stated that the second evening previous to presentation at the veterinary hospital, there had been a number of flying saucers in the sky and the calf had been seen observing them intently, with the head drawn backward and upward in order to get a proper view of the elevated objects. Since then, the animal had been unable to get its head back to normal position.

Examination revealed a state of opisthotonos essentially as the owner described, together with a certain degree of nystagmus, slight elevation of temperature, and complete loss of appetite. In deference to the owner's ingenious explanation, a diagnosis of "flying saucer reaction" was entertained with reservations. An autopsy the following day disclosed a cerebral abscess. *—Hilton A. Smith, D.V.M., Ph.D., professor of veterinary pathology, A. & M. College of Texas, College Station.*

Feeding comparatively large amounts of sulfaguanadine to normal rats for thirty days prior to mating caused a marked decrease in the number of offspring.—*Vet. Bull., 22, Dec., 1952.*

A Preliminary Report on the Isolation and Identification of the Bluetongue Virus from Sheep in California

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AN APPARENTLY new disease entity of sheep, which became known as soremuzzle for want of a more appropriate term, was first recognized in Texas in 1948. It was described by Hardy and Price[1] in 1951, who pointed out its close clinical resemblance to bluetongue, although their attempts to transmit an etiological agent were unsuccessful. In 1952, soremuzzle was reported from California by McGowan[2] who described the clinical condition in detail. Following its initial appearance in California in September of that year, the disease spread throughout practically the entire sheep-raising areas of the interior of the state by the end of November. Approximately 325,000 sheep were involved with a mortality estimated at 5 per cent.

The California workers also recognized the clinical similarity of soremuzzle to bluetongue and were successful in demonstrating, by transmission experiments, that the etiological agent was undoubtedly a virus. Having established this fact, attempts were then made to recover such an agent in embryonating eggs from field cases of soremuzzle occurring in the vicinity of Davis. Defibrinated or citrated blood from infected sheep, diluted 10^{-1} with infusion broth, and a 10 per cent suspension of infected sheep spleen in the same diluent, served as the original inoculums. Fertile hen eggs incubated for six to eight days at 38 C. were inoculated via the yolk sac route, each egg receiving 0.5 ml. of inoculum. In addition, eggs which had received a preliminary incubation of nine to eleven days' duration were inoculated by dropping 0.1-ml. amounts of either inoculum on the chorioallantois of each. For subsequent serial egg passage, emulsified embryo and chorioallantois, respectively, diluted 10^{-1}, 10^{-2}, or 10^{-3} in infusion broth were used for the inoculation of eggs by the yolk sac and the chorioallantoic routes. In view of the possibility that the agent involved was the bluetongue virus, and since Alexander[3] showed that the optimum growth temperature for this virus is 33.6 C., the inoculated eggs were incubated in duplicate sets — one at 33.6 C. in a forced-draught egg incubator, and the other in a large walk-in incubator regulated to maintain a temperature of 36.5 C.

The first seven field cases of soremuzzle on which isolation attempts were made yielded negative results. However, from the spleen of the eighth animal an agent was recovered in chicken embryos, inoculated by the yolk sac route and incubated at 33.6 C., which became fully adapted to propagate itself in the embryo by the third serial passage. With the single exception that a consistent embryo mortality pattern was not established until the fifth egg passage, by which time discrete foci were occasionally observed on the chorioallantois, parallel results were obtained when the chorioallantoic route of inoculation was employed. The mortality among embryos incubated at 36.5 C. was much lower than that resulting from incubation at 33.6 C.; consequently, all inoculated eggs were routinely incubated thereafter at the latter temperature. It was learned subsequently that recovery of the agent could be made much more readily from the spleen of experimentally infected sheep killed at the height of the febrile period, than from the spleens of naturally infected animals.* Thus, a second culture, or possibly strain, of the agent was recovered in chicken embryos by this procedure.

Using the original strain isolated, 2 sheep were inoculated intravenously with 1.0 ml. and 5.0 ml., respectively, of a 20 per cent embryo suspension of fourth passage virus, in allantoic fluid harvested from the same eggs. A third animal received 5.0 ml. of the same material subcutaneously. All responded with a severe febrile reaction and developed clinical symptoms of sore-

From the School of Veterinary Medicine, University of California, Davis.

*The authors are indebted to Dr. R. A. Alexander for this information. They also gratefully acknowledge his kind cooperation in undertaking to identify the virus.

muzzle from five to seven days following inoculation. Five milliliters of a filtrate of the same inoculum likewise produced the typical infection on intravenous inoculation into sheep, as did a 20 per cent suspension of chorioallantois in their allantoic fluid from the fifth serial chorioallantoic-inoculated egg passage.

Through the courtesy of Dr. R. A. Alexander, director of veterinary services for the Union of South Africa, arrangements were made to have this agent studied at Onderstepoort to determine its relationship to the bluetongue virus. Accordingly, fifth passage chicken embryo suspension and spleen suspension prepared from 1 of the 5 experimentally infected sheep mentioned above were forwarded for this purpose. In addition, these materials were sent in duplicate in the dried form. A brief report was received from Dr. Alexander which stated that the agent submitted was found to be a mild strain of bluetongue virus. He added, however, that it has been his experience in South Africa that where a mild strain of virus occurs, a more virulent one producing a mortality frequently exceeding 50 per cent is liable, eventually, to make its appearance.

Plans are currently underway to prepare an inactivated chicken embryo vaccine for the earliest possible use inasmuch as this is the only form of immunizing agent which can be made readily available. The virus is also being serially transferred in chicken embryos as rapidly as possible as a preliminary to the production of a modified live virus vaccine similar to the one which is being used so successfully in South Africa. Strains of bluetongue virus are characterized by a high degree of immunogenic specificity. An effort is therefore being made to secure, for virus isolation, infective material from other states in which so-called soremuzzle has occurred, in order to determine if a plurality of strains of bluetongue virus exists in this country. For a vaccine to give adequate protection against bluetongue, it must contain all the strains of virus which occur in any area where it is used.

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Clinical Report on Bluetongue

Bluetongue in California seemed to affect all types of adult sheep but rarely lambs. Morbidity was about 50 per cent with an average mortality of 5 per cent, although in two flocks mortality reached 40 per cent. The temperature may be normal or as high as 105 F.

Edema of the ears, head, and muzzle is frequent. Lesions on the lips become erroded and bleed easily. Inflammation in the mouth may result in ulcers from the dental pads to the soft palate and on the cyanotic tongue. Respiratory difficulty develops in some cases, usually accompanied by salivation then death in a few days. Lameness and congestion of the coronary band is often evident. Some reveal a soreness throughout the body. Small areas of muscle degeneration may be found in the heart and in any skeletal muscles, usually with gelatinous intermuscular septums and excessive peritoneal fluid. Treatment is of little if any value.—*Blaine McGowan, D.V.M., Davis, Calif.*

Bluetongue occurred in many sheep in the central valley of California but none in the Sierra Nevada foothills and very few in the western foothills. In white-faced sheep, the edematous ears and heads might be mistaken for photosensitization.—*Blaine McGowan, D.V.M., Davis, Calif.*

Foot rot in sheep is a specific disease which causes no swelling above the coronet. There is usually a moist necrosis of the heel and the medial wall of the hoof and an undermining and often a separation of the sole. It spreads only when the ground is wet and muddy.—*Hadleigh Marsh, D.V.M., Bozeman, Mont.*

One part per million of Na fluoride is added to drinking water to prevent tooth decay in children. It takes about 30 p.p.m. in feed to poison cattle. This usually occurs near industrial plants where calcium fluoride dust settles on forage plants.—*M. L. Miner, D.V.M., Logan, Utah.*

The Use of Dead Strain 19 Vaccine to Differentiate Vaccinal from Infection Titers of Brucellosis (*Abortus*) in Cows

R. D. BARNER, D.V.M., Ph.D.; F. H. OBERST, D.V.M.; F. W. ATKESON, M.S.

Manhattan, Kansas

A METHOD FOR the differentiation of vaccinal from infection titers of *Brucella abortus* was first reported by Dick *et al.*[1] This work was done with the use of live strain 19 vaccine. Later, Venzke,[2,3] and Barner, Oberst, and Atkeson[4] made additional reports. It was found that animals with a vaccinal titer responded to an injection of *Br. abortus* strain 19 by a rise in the blood serum agglutinins within a maximum of seventeen days,[1-4] whereas known positive animals would not.

Since it is known that dead strain 19 vaccine will stimulate the production of agglutinins, an experiment was conducted to ascertain its efficiency in differentiating between vaccinal and infection titers. The animals in this experiment were selected from a herd of dairy cattle wherein strain 19 Brucella vaccine was used in the control of brucellosis.

TECHNIQUE

Blood samples were taken at weekly intervals and the titers were determined by means of the rapid plate method. Serial dilutions were made in order to determine the higher titers. Commercial antigen of uniform sensitivity was used and the testing plate was allowed to incubate for ten minutes before observations were made. Three preinjection titers were determined, and animals with a static or decreasing titer were injected intramuscularly with 5 cc. of dead strain 19. Three postinjection blood serum-agglutination titers were determined at approximately one-week intervals.

To obtain the dead product, vials of commercially prepared liquid live strain 19 *Br. abortus* vaccine were placed in water, heated to 65 C. and held at this temperature for thirty minutes. The livability and the subsequent sterility of the product were ascertained bacteriologically.

Contribution No. 127 from the Department of Veterinary Medicine and No. 212 from the Department of Dairy Husbandry, Kansas State College, Manhattan.

From the Department of Pathology (Barner), Department of Surgery and Medicine (Oberst), and Department of Dairy Husbandry, head (Atkeson), Kansas State College, Manhattan. Dr. Barner is now associate professor, Department of Animal Pathology, School of Veterinary Medicine, Michigan State College, East Lansing.

The authors express thanks to members of the Department of Bacteriology, Kansas State College, for their sincere cooperation.

RESULTS

The results are shown (table 1) of the blood serum-agglutination tests on a group of cows vaccinated as calves with live strain 19 vaccine and from which *Br. abortus* had been isolated previous to this test. The preinjection titers among these animals varied from 1:100 to 1:6,400. There was no rise of titer effected upon the injection of dead vaccine. It is thought that in a chronologically infected animal the Brucella are continuously present as a stimulus to antibody production, and an additional stimulus by the injection of 5 cc. of dead *Br. abortus* strain 19 vaccine does not affect the titer of an infected animal within a period of seventeen days.

Data are presented in table 2 showing the effect of injection of dead strain 19 vaccine on cows having a negative (a 1:50 dilution) blood serum-agglutination titer. A rise of titer within seven days was noted in each instance.

The effect of injection of dead *Br. abortus* strain 19 on cows with a titer of 1:50 or higher is shown in table 3. There was a rise in titer in all animals of this group, and it is thought that they should be considered to be in the same category as those listed in table 2.

Table 4 shows the results of the test when applied to cows which previously had been vaccinated as nonreactor adults. The preinjection titers varied from 0 to 1:200. Since there was a rise of titer in each instance, such animals were considered to be noninfected.

Data are shown in table 5 for 2 animals which were vaccinated as infected adults. This test showed these animals as being chronically infected.

Table 6 shows the results obtained on cows which were injected twice with dead strain 19 *Br. abortus* vaccine. None of the preinjection or postinjection blood serum-agglutination titers fluctuated.

The postinjection average blood serum titers as a result of stimulation by dead strain 19 *Br. abortus* are given in table 7. For comparison, results on a group of cows

TABLE 1—Effect of Injection of Dead Strain 19 Brucella Abortus on Infected Cows* (Vaccinated as Noninfected Calves)**

Cow	Age	Titers (all dates 1950)					
		Preinjection		Date injected	Postinjection		
(No.)	yr.-mo.	8-17	8-23	8-31	9-7	9-15	9-22
124A	7- 5	800	800	800	800	800	800
128A	6- 8	6,400	6,400	6,400	6,400	6,400	6,400
133A	6- 1	200	200	200	200	200	200
137A	5-11	1,600	1,600	1,600	1,600	1,600	1,600
332B	3- 1	3,200	3,200	3,200	3,200	3,200	3,200
372A	6- 2	400	400	400	400	400	400
386A	5- 9	400	400	400	400	400	400
388A	5- 6	100	100	100	100	100	100
391A	5- 3	1,600	1,600	1,600	1,600	1,600	1,600

*Selected group of infected cows wherein immunity was not established following calfhood vaccination with strain 19 Brucella abortus vaccine.

**Br. abortus was isolated from all animals previous to injection of killed organisms.

TABLE 2—Effect of Injection of Dead Strain 19 Brucella Abortus on Noninfected Cows* (Vaccinated as Noninfected Calves)

Cow	Age	Titers (all dates 1950)					
		Preinjection		Date injected	Postinjection		
(No.)	yr.-mo.	8-17	8-23	8-31	9-7	9-15	9-22
145A	5- 3	0	0	0	200	400	400
164A	3- 4	0	0	0	200	400	200
261A	5- 1	0	0	0	400	400	400
279A	2- 5	0	0	0	400	400	400
280A	2- 5	0	0	0	800	400	400
282A	2- 5	0	0	0	200	200	200
304B	4- 2	0	0	0	200	200	200
326B	2- 5	0	0	0	400	200	200
327B	2- 5	0	0	0	200	400	400
354A	7- 5	0	0	0	100	200	200
359A	6-11	0	0	0	400	200	200
491A	3- 5	0	0	0	400	200	200

*Attempted isolation of Brucella not successful.

TABLE 3—Effect of Injection of Dead Strain 19 Brucella Abortus on Cows with Suspicious Titer or Higher* (Vaccinated as Noninfected Calves)

Cow	Age	Titers (all dates 1950)					
		Preinjection		Date injected	Postinjection		
(No.)	yr.-mo.	9-17	8-23	8-31	9-7	9-15	9-22
127A	7- 0	50	50	50	200	200	200
156A	3- 9	50	50	50	400	400	400
160A	3- 9	50	50	50	400	200	200
161A	3- 7	50	50	50	400	400	400
162A	3- 7	50	50	50	200	200	400
163A	3- 7	50	50	50	400	400	800
244A	6-10	100	100	100	200	200	400
249A	6- 8	50	0	0	400	200	200
251A	6- 5	50	50	50	400	800	800
253A	5-10	50	50	50	400	200	200
255A	5- 8	100	100	50	400	400	400
256A	5- 8	100	100	100	400	400	400
257A	5- 7	50	0	0	200	200	200
264A	4- 2	200	200	200	400	400	800
265A	4- 2	100	100	100	400	400	400
394A	5- 1	100	100	100	200	400	200
395A	5- 1	50	50	50	400	200	200
493A	2- 9	50	50	50	400	400	400

*Attempted isolation of Brucella not successful.

TABLE 4—Effect of Injection of Dead Strain 19 Brucella Abortus on Adult Cows* (Vaccinated as Nonreacting Adult Cows)

Cow	Age	Titers (all dates 1950)					
		Preinjection		Date injected	Postinjection		
(No.)	yr.-mo.	8-17	8-23	8-31	9-7	9-15	9-22
114A	8- 1	0	0	0	100	100	100
200A	12- 3	200	200	200	400	400	400
233A	8- 0	100	100	100	200	200	400
328B	11- 5	0	0	0	400	400	200
366A	7- 5	50	50	50	200	200	200

*Attempted isolation of Brucella not successful.

TABLE 5—Effect of Injection of Dead Strain 19 Brucella Abortus on Infected Cows* (Vaccinated as Infected Cows)

Cow	Age	Titers (all dates 1950)					
		Preinjection		Date injected	Postinjection		
(No.)	yr.-mo.	8-17	8-23	8-31	9-7	9-15	9-22
219A	10- 3	100	100	100	100	100	100
450A	8- 0	400	400	400	400	400	400

*Brucella abortus isolated from both animals previous to injection of killed organisms.

TABLE 6—Effect of Reinjection of Dead Strain 19 Brucella Abortus on Infected Cows*

Cow	Titer date reinjected	Postinjection titers		
(No.)	10-16-50	10-23-50	10-30-50	11-6-50
135A	200	200	200	200
219A	100	100	100	100
388A	100	100	100	100
450A	400	400	400	400

*Cattle included in this table were first injected with dead strain 19 Br. abortus on Aug. 31, 1950 (see tables 1 and 5).

TABLE 7—Effect of Injection of Dead Strain 19 Brucella Abortus Vaccine on Vaccinal Titers

No. of Animals	Preinjection blood serum titer	Postinjection ave. blood serum titer	Ave. No. of twofold dilution increase
16	0	1:400	3.7
12	1: 50	1:200	3.0
5	1:100	1:400	2.0
2	1:200	1:500	1.5
Total 35			3.04

TABLE 8—Effect of Injection of Live Strain 19 Brucella Abortus Vaccine on Vaccinal Titers

No. of Animals	Preinjection blood serum titer	Postinjection ave. blood serum titer	Ave. No. of twofold dilution increase
13	0	1:800	4.8
11	1: 50	1:800	4.2
6	1:100	1:800	3.0
2	1:200	1:800	2.0
Total 32			3.97

stimulated by injection of live strain 19 *Br. abortus*, previously reported by Barner, Oberst, and Atkeson,[4] are shown in table 8.

SUMMARY AND CONCLUSIONS

1) Nine cows proved to be infected, by isolation of *Brucella abortus* organisms from each, were injected with dead strain 19 *Br. abortus* vaccine. Prevaccinal titers of the cows ranged from 1:100 to 1:6,400. None of the cows showed a rise in titer after injection.

2) Twelve cows showing a negative reaction were likewise injected with dead strain 19 *Br. abortus* vaccine. All cows showed a rise in titer seven days after injection.

3) Eighteen cows classified as suspicious were injected with dead strain 19 *Br. abortus* vaccine and all of the animals showed a rise of titer.

4) Four cows which previously had been vaccinated as nonreacting adults were injected with dead strain 19 *Br. abortus* vaccine. Agglutination titers just previous to injection ranged from negative to 1:200. All animals showed a rise in titer within one week following injection.

5) Two animals previously vaccinated as known infected adult cows were injected with dead strain 19 *Br. abortus*. The agglutination titers remained static before and after injection.

6) Four infected cows previously injected with dead strain 19 *Br. abortus* were reinjected with a like antigen. The titers remained at a static level.

7) The average number of twofold dilutions in blood serum-agglutination titer rise was 3.04 in cows injected with dead strain 19 *Br. abortus* vaccine and 3.97 in cows injected with live strain 19 *Br. abortus* vaccine.

8) Vaccinal titers may be differentiated from infection titers by the use of dead strain 19 *Br. abortus* vaccine.

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Stunting in young animals has usually been blamed on poor nutrition, parasites, or genetics but it may be due to chronic virus infection. Many stunted heifers have chronic high temperatures. Pigs which recover from transmissible gastroenteritis or from a reaction to a modified hog cholera virus often are stunted.—*James Baker, D.V.M., Ithaca, N. Y., at the Intermountain V.M.A. Meet.*

Associated Serum Producers Sponsor Essay Contest

More than 125 seniors in the United States veterinary colleges have already filed entries in the $3,000 essay contest, announced recently by Associated Serum Producers, for the best papers written on the subject of "Veterinary Public Relations."

The educational committee of A.S.P. reports the number of entries by veterinary schools in the following colleges and universities: University of Georgia, 18; Kansas State College, 12; Alabama Polytechnic Institute, 11; Texas A. & M. College, 9; Oklahoma A. & M. College, 9; Michigan State College, 8; Cornell University, 8; University of California, 8; Iowa State College, 7; University of Illinois, 7; State College of Washington, 7; Ohio State University, 6; Colorado A. & M. College, 5; University of Missouri, 4; University of Pennsylvania, 5; Tuskegee Institute, 3; and the University of Minnesota, 2.

All senior students in accredited veterinary medical schools in the United States are eligible to participate. Essays must be on file with Associated Serum Producers, 518 Grand Ave., Des Moines, Iowa, on or before April 15, and awards will be made by mid-May, ahead of graduation.

Mr. Chinniah Not a Veterinarian

The JOURNAL has been reliably informed that Mr. Chinniah, Colombo, Ceylon, author of the case report on "Embryotomy of Siamese Twins in a Buffalo Cow" (Dec., 1952: 443), is not a graduate veterinarian. Bona fide veterinarians in Ceylon are striving to obtain an official registration of veterinarians.

Anthrax—Response to Terramycin Therapy

WILLIAM W. BAILEY, D.V.M.

Sussex, New Jersey

SINCE THE THIRD week in May, 1952, the writer has treated more than 170 cases of anthrax in dairy cows and a number of cases in horses. Diagnosis was confirmed by the New Jersey State Division of Animal Industry Laboratories at Trenton.

The histories of these cases are similar. These animals were among 6,531 which had been vaccinated against anthrax, between March 26 and May 19, with anthrax bacterin. The dose in most cases was 5 cc. injected posterior to the scapula in cows, and in the side of the neck in horses. Bacterins from three producers were used. The disease appeared thirty to 139 days after vaccination, the average interval being fifty to sixty days.

The symptoms were quite uniform. Most of the cows had hot, hard swellings extended, in some cases, as far down as the fetlock. A few animals showed no swelling. Many had poor appetites, dyspnea, reduced milk production, and temperatures from normal to 107.8 F. Some had sway-backs.

Of the 214 cases treated, 6 died and 1 was destroyed. Four others were found dead and 1 recovered without treatment. Two typical case histories are reported.

Case 1.—A Holstein-Friesian cow, weighing 1,100 lb., was treated with anthrax bacterin on May 7 and freshened in early June. On July 5, fifty-nine days after she had received the anthrax bacterin and less than twenty-four hours after she became ill, the author was called. At that time, her condition was fair; respiration normal; temperature, 107 F. Her symptoms were anorexia; a drop in milk production from 14 quarts to none; and extensive swelling from shoulder to fetlock and brisket. Terramycin was given intravenously, 1 Gm./10 cc. of saline solution (*see* table 1).

TABLE 1—Results of Terramycin Treatment (Case 1)

Date	Terramycin	Temp.	Results
7/5—11:45 a.m.	2 Gm.	107.0 F.	No milk
7/6—10:00 a.m.	1 Gm.	105.6 F.	Appetite improved; 3-4 quarts milk
7/7— 8:15 a.m.	1 Gm.	normal	Swelling receding
7/8—10:00 a.m.	1 Gm.	normal	7 quarts milk; swelling further receded

Results and Evaluation.—The rapid recovery of this animal was due to terramycin therapy. It seems to act more effectively and more rapidly in this condition than does penicillin.

Case 2.—A 12-year-old draft gelding, weighing 1,300 lb., was treated with anthrax bacterin on May 6. A veterinarian was called on June 25, after an interval of fifty days, because the owner had noticed a swelling at the fetlock the previous evening. The animal's condition was fair; respiration, normal; temperature, 104 F. The symptoms were moderate swelling from the elbow down to and including the right fetlock, and the left sternal region; swelling on the left side of face to lips, including submaxillary and parotid lymph glands; eating some hay and grain; forelimbs stiff. The diagnosis was anthrax (clinical diagnosis).

TABLE 2—Results of Terramycin Treatment (Case 2)

Date	Terramycin	Temp.	Remarks
6/25— 2:00 p.m.	4 Gm.	104.0 F.	
6/25—10:00 p.m.	2 Gm.	105.0 F.	No improvement
6/26— 6:15 a.m.	2 Gm.	103.8 F.	Improved appetite; swelling in face and sternal region reduced.
6/27— 6:00 a.m.	1 Gm.	101.4 F.	All swellings receding.
6/28—11:00 a.m.	no further treatment	normal	Swelling almost completely gone; appetite normal; general attitude good; advised owner to work horse in 2 or 3 days.

Terramycin was given intravenously, 1 Gm./10 cc. of saline solution (table 2).

Results and Evaluation.—Some cases failed to respond to penicillin therapy. Treatment of about 60 of the first cases consisted of terramycin, intravenously, plus penicillin for three to four days, followed by penicillin for forty-eight hours as a safety measure. Later, the administration of penicillin was discontinued and the therapeutic response to terramycin alone was as prompt and effective as the com-

Dr. Bailey is a general practitioner in Sussex, N. J.

bined terramycin-penicillin therapy had been.

Summary.—Anthrax followed vaccination of cows and horses with anthrax bacterin within four to twenty weeks. The diagnosis was confirmed by the New Jersey State Laboratories. Some cases failed to respond to penicillin therapy. Terramycin was then used concurrently with penicillin and the response was prompt and effective.

More than 65 cases treated with terramycin alone responded promptly. The initial dose was approximately 2 mg./lb. the first day, then 1 mg./lb./day as long as indicated.

To date, 214 cases have been treated with terramycin intravenously, terramycin intravenously plus penicillin intramuscularly, and penicillin alone. In the majority of cases, terramycin alone yielded the most satisfactory results.

This is only a preliminary report, as anthrax is still very much in evidence in this area.

Terramycin in the Treatment of *Salmonella California* Infection in Turkeys

DONALD C. MACKEL, M.S.; MILDRED M. GALTON, M.Sc.; JOHN S. COWDERY, M.D.; ALBERT V. HARDY, M.D., Dr. P.H.

Jacksonville, Florida

On Oct. 23, 1950, 5 turkeys from a flock of 1,300 White Holland and Bronze birds 14 weeks of age were submitted to the laboratory for examination. About one quarter of the flock had died of an acute epizoötic disease. The severe symptoms were diarrhea, loss of weight, and in many instances enlarged hock joints, as well as sluggishness, ruffling and loss of feathers, and drooping wings. Postmortem cultures revealed *Salmonella california* in the cecal contents of 3 of the 5 birds, and in the heart blood of 1 of the 3.

The *in vitro* sensitivity to aureomycin, chloromycetin, terramycin,* streptomycin, neomycin, and sulfadiazine was determined, and this strain of *S. california* was very sensitive only to terramycin. The severity of the disease believed to be due to this organism provided a desirable opportunity to evaluate therapy. With the coöperation of the flock owner, 50 turkeys were selected, identified by leg band numbers, and isolated from the remainder of flock. The 26 birds showing severest clinical symptoms were selected to be treated and placed in one house; the remaining 24 were housed in another building as bacteriological controls.

On October 30, cloacal cultures were taken on the 26 turkeys to be treated. Each bird was immediately given 250 mg. of terramycin and that night a 125-mg. capsule. Thereafter, 125 mg. of the drug was given morning and night for a total of five additional days. Cultures were taken on the treated and control groups at the end of one, two, three, and four days of treatment and one and three days after the termination of therapy.

Six birds in the treated group died, 1 immediately after the first treatment, 3 after one day of treatment, 1 after two days, and 1 after the conclusion of medication. There were no deaths among the less affected controls. There was no evidence of bacteriological change in the controls during the period of observation. Of the 120 cultures on 20 proved positive controls, 53 (44%) were positive. There were 27 positive cultures in the first three examinations and 26 in the last three. In the treated group, there were 14 (58%) positive pretreatment cultures on 24 proved positive turkeys (the 2 negative birds died after one and two negative cultures respectively). During treatment, 85 cultures were taken and of these only 5 (6%) were positive. There was notably little growth on the BG agar in these cultures. However, of 39 post-treatment cultures, 29 (74%) were positive. This rapid return of positive cultures after the conclusion of therapy suggested that the terramycin merely suppressed the growth of organisms in the enteric tract or in the culture.

Ten 12-week-old turkeys were purchased from a flock free of infection and were culturally proved negative on 5 examinations. The object was to infect with terramycin-

From the Florida State Board of Health, Bureau of Laboratories. This work was supported in part by the Office of the Surgeon General, Department of the Army, through the Commission on Enteric Infections of the Armed Forces Epidemiological Board, and in part by the Communicable Disease Center, Atlanta, Ga.

Bacteriologist (Mackel), epidemiologist (Cowdery), and director (Hardy), Bureau of Laboratories, Florida State Board of Health, Jacksonville, Fla.; and bacteriologist (Galton), Communicable Disease Center, Public Health Service, Federal Security Agency, Atlanta, Ga., assigned to Bureau of Laboratories, Florida State Board of Health.

*The terramycin used in this study was furnished by Chas. Pfizer & Co., Brooklyn, N. Y.

sensitive *S. california* organisms and to treat under close observation. Each bird was given initially, through a blunt needle in the esophagus, approximately 3 billion living organisms. Daily cloacal cultures yielded *S. california* intermittently in all birds, but only 2 developed clinical symptoms, 1 beginning on the eleventh and 1 on the twenty-ninth day postinfection. The former died without treatment and the latter failed to respond to six days of terramycin therapy. The diarrhea continued and its hock joints were swollen to four times their normal size. The bird was killed five days after treatment stopped. The enlarged joints contained about 10 ml. of culturally sterile fluid. Extensive postmortem cultures for Salmonella were all negative.

In two additional attempts to produce disease in the remaining 8 birds by giving large doses of *S. california*, there was no response except the recurrence of the intermittently positive enteric cultures. All developed agglutinins for *S. california;* the final titer in 7 was 1:640 or higher and the remaining 1 had a titer of 1:160. Postmortem examinations revealed no abnormalities and all tissue cultures were negative.

The serum of the last bird under treatment was repeatedly examined to determine the serum antibiotic level. A disc method was used. It entailed moistening the disc with the turkey serum and applying it to a blood agar plate inoculated with a terramycin sensitive Staphylococcus. These attempts to demonstrate any antibiotic activity of the serum were unsucessful.

It appears, therefore, that terramycin given by mouth to turkeys is absorbed poorly if at all and remains chiefly in the enteric tract. The relatively high concentration attained in the fecal contents apparently modifies the growth of the organisms in the enteric tract; or possibly the amount of antibiotic inoculated to the culture medium with the fecal swab is sufficient to inhibit growth. There was no evidence of beneficial therapeutic effect on the symptom complex presumably due to the *S. california*.

In treating acute bovine leptospirosis, blood transfusions seem to have value. Antibiotics do not seem to alter the course of the disease.—*J. A. Howarth, D.V.M., Davis, Calif.*

The Use of a Cholinesterase Inhibitor in Neuromuscular Dysfunctions of the Horse

GEORGE F. BADAME, D.V.M.

Toronto, Ontario

Physostigmine and related alkaloids show an ability to inhibit cholinesterase in body fluids and tissues. This property acts to prevent hydrolysis of acetylcholine.

Physostigmine is an alkaloid of the calabar bean, the fruit of *Physostigma venenosum*, and is official in the "United States Pharmacopeia" as the salicylate. It is a cholinesterase inhibitor; therefore its actions are those of acetylcholine. To elaborate this thesis, it is necessary to review briefly the mechanism involved. Unfortunately, the exact mechanism of nerve impulse transmission has not yet been determined, and there are several theories which account for some of the observed phenomena. The validity of these theories is not completely proved, but the "chemical" theory involving acetylcholine (ACH) and the enzyme which hydrolyses it, cholinesterase (CHE), seems quite widely accepted and to have a strongly supported experimental background.

Stimulation of a nerve results in the formation or appearance of ACH at the neurone junctions or synapses. This compound is rapidly hydrolyzed by the CHE surrounding the synapse and is attendant to the propagation of the nerve impulse. It can readily be seen that inactivation of CHE results in a continued existence of ACH, with impulses of greater duration and magnitude in the cholinergic nerves. Physostigmine inactivates CHE and has numerous actions in its role of parasympathetic stimulant, as can be seen from table 1.

Since physostigmine and related alkaloids show an ability to inhibit cholinesterase in body fluids and tissues, it is apparent that relief of symptoms by means of physostigmine therapy is dependent upon the presence of acetylcholine in tissues involved.

The recent findings of Goldstein show that cholinesterase inhibitors, such as physostigmine, are really competitive substrates with low turnover numbers. They are destroyed by plasma cholinesterase at

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the same rate of speed as acetylcholine but receive preferential attention from cholinesterase because of their easier turnover. Further, the effects of physostigmine can be duplicated with slowly injected extrinsic acetylcholine and are reversible with atropine. Unpleasant parasympathetic side effects are avoided by coadministration of atropine sulfate in the same dosage form. This fortunate characteristic results from atropine's postganglionic, cholinergic nerve depressant functions. It does not interfere with acetylcholine formation but desensitizes appropriate neural fibers to the action of acetylcholine. The ratio of drugs in the preparation used in our studies is consistent with active stimulation of skeletal muscle with a minimum of side stimulations.

TABLE 1—Actions of Physostigmine and Atropine

	Physostigmine	Atropine
Cranial nerves	X*	—**
Heart	—	X
Miosis	X	—
Muscles, fascicular	X	inactive**
skeletal	X	inactive
Nausea	X	—
Peristalsis, intestinal	X	—
ureteral	X	—
uterine	X	—
Respiration	—	X
Salivary glands	X	—
Sphincters	—	X

X = Stimulated or caused stimulation; — = depressed or suppressed.

*Theoretically stimulated as part of the parasympathetic system. No extensive studies are available. **Atropine does not inhibit the physostigmine stimulation of the trifacial nerve in quantities sufficient to fully inhibit intestinal stimulation. Its antagonism in the cranial nerves varies considerably.

A stabilized, aqueous, injectable form* of physostigmine salicylate with atropine sulfate (physostigmine salicylate 15 mg./cc.; atropine sulfate, 10 mg./cc.) was selected for trials in the cases reported below.

Case 1.—A bay Thoroughbred gelding, 7 years old, would crouch and evince pain, according to the owner, every time an exercise boy mounted the horse. Upon palpation over the longissimus dorsi muscles and anterior gluteal region, the animal would flinch and appeared extremely sensitive. The diagnosis was chronic myositis.

Beginning May 1, 1951, intramuscular injections of physotropin L. A. were made as follows:

Day	*Physotropin L. A.*
1	1 cc.
2	2 cc.
3	2 cc.
4	2 cc.
5	3 cc.
6	3 cc.
7	4 cc.

Anorexia was observed the first day but no other side reactions were observed.

At the end of seven days of treatment, all symptoms had disappeared and the horse would not crouch or evince pain when the exercise boy mounted. To date (Oct. 1, 1952) there has been no recurrence of symptoms.

Three other cases of chronic myositis displaying similar symptoms were treated and the results were good.

Case 2.—A brown Thoroughbred gelding, 2 years old, showed symptoms of muscular incoördination of the hind quarters when exercised. The exercise boy stated that during a workout the horse would change stride repeatedly. The muscles of the thigh and gluteal region showed no evidence of pain or atony when palpated.

The diagnosis was posterior ataxia.

Beginning in April, 1951, intramuscular injections of physotropin L. A. were made as described in case 1. Anorexia was observed on the first day of treatment. Little improvement was noted until the sixth day whereupon the horse showed more coördination and his movements and stride improved.

It was decided to repeat the course of treatment two weeks later. After the second course of treatment, all symptoms disappeared. To date (Oct., 1952) there has been no recurrence of symptoms.

Case 3.—The owner of a 2-year-old brown Thoroughbred gelding referred to it as a "wobbler." The animal showed a complete incoördination of all movements involving the legs. The exercise boy stated that he thought the horse would fall at any time during his exercise. In the stall, it appeared at times as though the horse was suffering from paroxysms of intense pain.

The diagnosis was locomotor ataxia.

Although the owner was given a poor prognosis, it was decided that a course of physotropin L. A. was indicated. The results were negative after seven days of treatment.

Case 4.—A 7-year-old Thoroughbred mare, after a workout, would suffer from

*Physotropin L. A. is produced by S. F. Durst & Co. Inc., Philadelphia 20, Pa.

severe muscular cramps involving the longissimus dorsi muscles and the muscles of the gluteal region. The animal walked with great difficulty. The symptoms and history were similar to azoturia but myohemoglobinuria was absent. The symptoms lasted for about an hour and a half. The muscles involved felt hard and appeared to be in spasm.

The diagnosis was spasmodic myalgia.

Beginning in June of 1951, physotropin L. A. was administered as in case 1. Improvement was noted after the administration of the first two injections, and symptoms disappeared completely after the last injection. To date, October, 1952, there has been no recurrence of symptoms.

Four other cases of spasmodic myalgia showing identical symptoms were treated and the results were similar.

Discussion.—The use of an anticholinesterase agent seems to be especially effective in the treatment of chronic myositis and spasmodic myalgia in the horse. Comparison of history and symptoms of the latter condition with the findings of Steele showed agreement in the diagnosis. Steele employed parenteral B-complex therapy with beneficial results.

Anorexia was observed in all cases on the first day or two of treatment. Other side reactions were absent. It should be noted that, in the author's opinion, condition such as locomotor ataxia in which degeneration of the spinal cord or the nerve trunks is present will not benefit from treatment with this agent.

Summary.—Ten Thoroughbred horses were treated with physotropin L. A. for various selected neuromuscular dysfunctions. Responses varied from fair to excellent. The results obtained in cases of spasmodic myalgia and chronic myositis were excellent. These conditions are commonly encountered in equine practice and are difficult to treat by ordinary methods.

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The Effect of Isonicotinic Acid Hydrazide on *Mycobacterium Paratuberculosis*

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A large number of new agents for the treatment of tuberculosis have been examined in recent years. A few were found to inhibit the growth of *Mycobacterium paratuberculosis* cultures in low concentration; however, none was found to be a satisfactory therapeutic agent when administered to cattle in an advanced stage of Johne's disease.[1,2] One of the most active of these compounds against tuberculosis is isonicotinic acid hydrazide. Experiments carried out at this laboratory showed that this drug inhibited growth of *M. paratuberculosis* when 25 μg. per milliliter of medium were added. It was, therefore, decided to study its effect on a clinical case of Johne's disease.

An Aberdeen Angus cow, 4 years of age, which has been showing evidence of Johne's disease for sixty days was used in this study. The cow was emaciated and the diagnosis had been supported by demonstrating *M. paratuberculosis* in stained smears made from scrapings of the rectal mucosa and by obtaining a positive intradermal johnin reaction.

The drug was administered orally twice daily for twenty-five days. The daily dose per kilogram of body weight was 4 mg. for the first seven days and increased to 8 mg. per kilogram for the remaining eighteen days. After a lapse of three days (29th day) a final dose of 15 mg. per kilogram was administered.

During the first week of treatment, the feces became firm and normal, the animal gained 30 lb. and showed marked improvement in general appearance. The diarrhea recurred during the fourth week, while still on treatment, and the animal started to decline rapidly. She died two weeks later.

Postmortem examination revealed no pathology except typical gross Johne's disease lesions. Small, acid-fast bacilli were demonstrated in stained smears prepared from

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the mucosa in the region of the ileocecal valve. No gross pathological changes that could be attributed to the therapy were observed.

Summary.—Although isonicotinic acid hydrazide inhibited the growth of cultures of *Mycobacterium paratuberculosis* at a level of 25 μg. per milliliter of medium, it was not a satisfactory therapeutic agent in one case of advanced Johne's disease. A final conclusion as to the effectiveness of this agent against Johne's disease can not be reached from the results obtained with one animal, but additional clinical cases were not available at the time.

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[2]Larsen, A. B., and Vardaman, T. H.: The Effect of Viomycin, 4:4' Diamino Diphenyl Sulfone and Other Agents on *Mycobacterium Paratuberculosis*. Am. J. Vet. Res., *13*, (1952):466-468.

A species of gnat which is credited with transmitting bluetongue, in South Africa, is present in California. A sheep may be the source of infection for four months after recovery.—*Blaine McGowan, D.V.M., Davis, Calif.*

Orchitis and Varicocele of an Undescended Testicle

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One of the most common of the congenital anomalies frequently seen in veterinary medical practice is the undescended testicle. This condition occurs whenever the testicle descent is arrested at one point or another from the kidney to the inguinal canal. It may be due to a deficiency or complete absence of the anterior pituitary gonadotrophic hormone or to some physical peculiarity. Treatment of young cryptorchid animals with the gonadotrophic hormone may bring response. Clinically, we use 1,000 to 3,000 units per dose, according to size. Usually, cryptorchidism is either unnoticed by the owner or is completely ignored because the animal exhibits no untoward physical effects.

Recently, a case of complicated cryptorchidism in a 2-year-old male Boxer was presented at our hospital. The animal had a good appetite but was definitely underweight and appeared debilitated. It was completely lethargic. The owner reported this decline in condition over a period of

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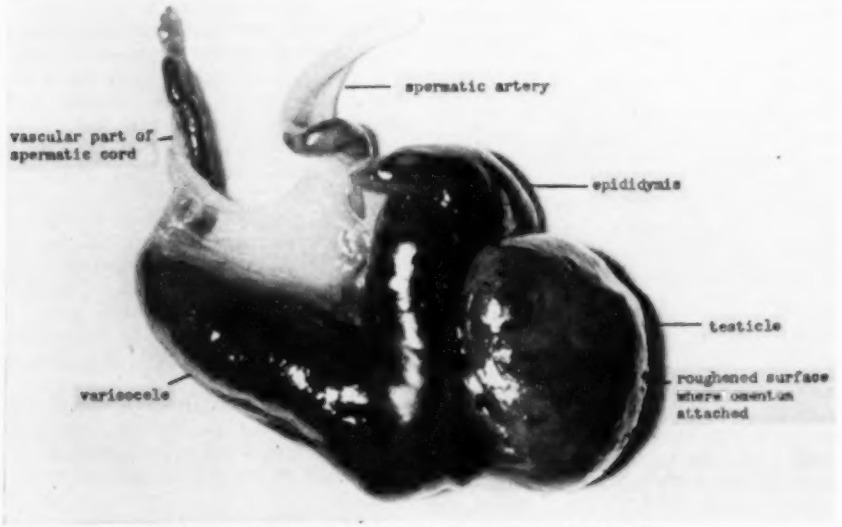

Fig. 1—Orchitis and varicocele of an undescended testicle.

one month. Bowel evacuations were normal. The temperature was 102.6 F. The physical examination was resented when the undescended testicle was palpated. Apparently, the physical pain was excruciating. The undescended testicle was felt to be at least twice the size of a normal one. Actually, however, it was about one-half the normal size. With this history and symptomatology, a laparotomy was deemed imperative.

Intravenous sodium pentobarbital was administered for anesthesia. Only 1 cc. was required for each 7 lb. of body weight instead of the usual 1:5 ratio for surgical anesthesia. Such a ratio differential is frequently seen whenever the animal is toxic or senile.

The initial skin incision was made over the palpated undescended testicle, about ½ inch lateral and parallel to the penis. Immediately upon entering the peritoneal cavity, a large blackish mass was identified as the undescended testicle. The organ was extremely vascular and heavily engorged with blood — a case of varicocele or varicosity of the vein plexus in the spermatic cord. Such an engorgement exerting pressure on a sensitive organ probably accounted for the severe pain when it was palpated. It also probably caused the animal to display inappetence and to appear depressed. The testicle was covered, in part, with omentum which had to be stripped off before the organ could be ligated and removed.

This orchitis-varicocele condition was probably traumatic in origin. No evidence of malignancy (common in human cryptorchid conditions) could be found. The owners were cautioned not to use the animal as a stud due to the possibility of cryptorchidism being inherited.

The animal recovered rapidly, and six days following surgery was active to the point of being playful. Fifteen days following surgery he was nearing normal body weight and all body functions were apparently normal.

Following removal of the undescended testicle, the descended one practically doubled in size and appeared normal three weeks following surgery. This change probably was due to the reëstablishment of a more normal hormone balance within the body.

Rabies in St. Louis

The Missouri Division of Health reports that St. Louis, with a population of 857,000, had 309 cases of rabies in dogs the first half of 1951. In the fifteen years since 1936, the city has reported 1,677 cases (practically all in dogs), an average of 105 rabid animals a year. During an epizoötic from 1942 through 1944, there were 730 confirmed rabid dogs. In 1947 and 1949 no cases were reported. When 6 cases were reported during November and December, 1950, the mayor proclaimed a quarantine, requiring all dogs to be on leash, and a crew of dog catchers was mobilized. In spite of this, there were 11 cases in January, 1951, and a peak of 79 rabid dogs in May. A public health veterinarian was then assigned to the area and on his recommendation, mass immunization clinics were established.

On May 23, 18 clinics went into operation from 4 to 8 p.m. for seven days, during which time 38,000 dogs were vaccinated at a cost of $1 per head when the owner was willing to pay. Approximately 20,000 other dogs were vaccinated in private offices by veterinarians; thus, during the first half of 1951, about 58,000 dogs were immunized in the city. This was 200 per cent of the number of dogs for which licenses were issued. To eliminate stray dogs, four trucks operated sixteen hours a day for two weeks. Dogs unclaimed after seventy-two hours were destroyed. During August, just two months after the clinics closed, only 1 rabid dog was reported. Only 18 cases were diagnosed in the last half of 1951, compared to 309 in the first half. During the first nine months of 1952, 22 cases were reported.

Pathogenesis of Rabies

Inoculation of the masseter muscle of a rabbit with fixed rabies virus does not lead to an early paralysis of the masticatory muscles of the same side. In 5 of 13 animals, paralysis began in the hind limbs. No lesion was found in the corresponding motor nucleus of the fifth nerve, even when there was already evidence of widespread involvement of the nervous system. Spread by the blood stream and cerebrospinal fluid is considered.—*Vet. Bull., Nov., 1952.*

Preliminary Observations on the Use of Certain Nitrofuran Compounds in the Control of Enterohepatitis (Blackhead) in Turkeys

J. K. McGREGOR, D.V.M., D.V.P.H.

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HARWOOD AND STUNZ[1] have made a contribution to knowledge concerning the effect of nitrofurazone* on avian coccidiosis. However, the activity of nitrofurazone or any of the related nitrofuran compounds in the control of enterohepatitis in turkeys has not been as clearly defined.

The experimental work described in this report was undertaken to demonstrate any activity that nitrofurazone and five other nitrofuran compounds might have in combating enterohepatitis.

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*Nitrofurazone — 5 nitro-2-furaldehyde semicarbazone.

Thanks are extended to Drs. T. L. Jones and A. A. Kingscote of the Ontario Veterinary College for support and assistance in conducting this experimental work, and to Professor J. R. Cavers of the Poultry Department, Ontario Agricultural College, and members of his staff for their coöperation in furthering this work.

The chemicals used in these experiments were supplied through the courtesy of the Eaton Laboratories, Norwich, N. Y.

[1]Harwood, Paul D., and Stunz, Dorothy I.: Nitrofurazone in the Medication of Avian Coccidiosis. J. Parasitol., 35, (1949): 175-182.

MATERIALS AND METHODS

To accommodate the number of birds used in this trial, the experiment was divided into two parts. Beyond a difference in age between the two experimental lots of birds used and in the drugs tested, the two phases of the experiment were conducted similarly. Conditions of husbandry and environment were kept essentially equal in both parts of the experiment.

In the first phase of this trial, which lasted twenty-five days, 126 turkeys, 12 weeks old, were divided into seven groups of 18 birds each. The groups were designated A, B, C, D, E, F, and G. The birds in group A were kept as untreated controls. The birds in the other groups were given various nitrofuran (NF) drugs in several concentrations as prophylactic or therapeutic agents as shown in table 1, part 1.

In the second portion of this experiment 119 turkeys, 16 weeks old, were divided into seven groups of 17 birds each. The groups were designated H, I, J, K, L, M, and N with the birds in group H used as untreated controls. The birds were handled in exactly the same manner as those used in part one. The drugs used, dosage,

TABLE 1—Nitrofuran Drugs Given as Prophylactic or Therapeutic Agents to Various Groups of Turkey Poults

Group	Chemical used		Nitrofuran symbol	Concentration in feed
		PART 1		
A	None			Untreated controls
B	5-nitro-2-furaldehyde semicarbazone	Prophylaxis	NF 7	1:6,000
C	Methyl 5-nitro-2-furfuryl ether	Prophylaxis	NF 45	1:6,000
D	5-nitro-2-furaldehyde semioxamazone	Prophylaxis	NF 84	1:6,000
E	5-nitro-2-furaldehyde semicarbazone	Therapeusis	NF 7	1:2,000
F	Methyl 5-nitro-2-furfuryl ether	Therapeusis	NF 45	1:2,000
G	5-nitro-2-furaldehyde semioxamazone	Therapeusis	NF 84	1:2,000
		PART 2		
H	None			Untreated controls
I	N-(5-nitro-2-furfurylidene)-1-amino hydantoin	Prophylaxis	NF 153	1:7,000
J	N-(5-nitro-2-furfurylidene)-3-amino-2-oxazolidone	Prophylaxis	NF 180	1:8,000
K	5-nitro-2-furaldehyde 4-(diethylamino-propyl) semicarbazone hydrochloride	Prophylaxis	NF 185	1:7,000
L	N-(5-nitro-2-furfurylidene)-1-amino hydantoin	Therapeusis	NF 153	1:3,000
M	N-(5-nitro-2-furfurylidene)-3-amino-2-oxazolidone	Therapeusis	NF 180	1:4,000
N	5-nitro-2-furaldehyde 4-(diethylamino-propyl) semicarbazone hydrochloride	Therapeusis	NF 185	1:3,000

and purpose for which they were intended are indicated in table 1, part 2. This second phase of the experiment lasted twenty-nine days.

Each bird used in the experiment was artificially infected with a capsule containing approximately 500 embryonated Heterakis spp. eggs administered by mouth. In each part of the experiment birds were infected on the same day.

Suitable prophylactic and therapeutic dosages of body weight, was considered undesirable for some indication of the toxic levels for each drug for birds, a pilot experiment was conducted using 8-week-old cockerels. All dosages were arranged on the basis of a definite concentration in the feed, given daily. The data obtained from the pilot experiment were used to set up an arbitrary schedule of dosage for the experimental turkeys used in the principal experiment. The dosages of drugs used in each experimental group of turkeys were arbitrarily reduced to a point considered to be well within their safety limits. The method of devising dosage, based on milligram values per kilogram of body weight, was considered undesirable for the purposes of this experiment. This latter method was not used, since daily weight changes would require an impractical and everchanging system of individual doses.

Where the six nitrofurans tested were applied as prophylactic agents, they were administered in the feed at least forty-eight hours prior to the infection of the birds. Therapeutic dosage of all six chemicals used was given at the first sign of blackhead in the flock. Capsules containing individual daily doses of the chemicals were administered to birds that were too sick to feed in the "therapy" groups. This latter measure was adopted to insure that each chemical would have a full opportunity to act.

RESULTS AND DISCUSSION

Table 2 summarizes, in part, the results achieved by the administration of various nitrofuran compounds under the conditions of this experiment.

The losses from blackhead shown in table 2 indicate the virulence of infection induced in this experiment. An infection of similar magnitude encountered in the field would be rare; hence the challenge to which each drug was submitted may be considered very severe.

From the data in table 2, it is clear that NF 7, NF 45, NF 84, and NF 185 were of no value in preventing or curing blackhead when used under the conditions of this experiment.

The information given in table 2 for NF 153 and NF 180 is not conclusive. Where NF 153 was given to birds in group L in 1:3,000 concentration, 82.35 per cent of the birds died of blackhead. This figure was high but was lower than in any other of the therapeutically treated groups. The number of birds that died from the disease at any one time in group L was noticeably less than in other groups.

The birds in group J were given a daily prophylactic dose of NF 180 at 1:8,000 concentration. This procedure gave these birds a limited degree of protection against blackhead. It was observed that symptoms of disease did not develop till three or four days after they appeared in the control and the other associated groups in this section of the experiment. When symptoms of blackhead did finally appear, the course of the disease was milder than that seen in the control group where symptoms were severe and deaths occurred shortly after the onset of disease.

The evidence presented in the case of NF 153 and NF 180 suggests strongly that if dosage levels had been higher in each case, positive results would have been more clearly established. Therefore, further experimental work using NF 153 and NF 180 may be justified.

It should be noted that the evidence gathered in this experiment did not establish any superiority of the nitrofurans

TABLE 2—Results Achieved by Administration of Various Nitrofuran Compounds Under Experimental Conditions

Group		No. of birds	Drugs*	Concentration of drugs used in feed	Deaths from blackhead (No.)	Deaths from blackhead (%)
PART 1 OF EXPERIMENT						
A		18	Controls	.....	18	100
B	Therapeusis Prophylaxis	18	NF 7	1:6,000	16	88.88
C		18	NF 45	1:6,000	18	94.44
D		18	NF 84	1:6,000	17	100
E		18	NF 7	1:2,000	18	100
F		18	NF 45	1:2,000	18	100
G		18	NF 84	1:2,000	18	100
PART 2 OF EXPERIMENT						
H		17	Controls	.....	17	100
I	Therapeusis Prophylaxis	17	NF 153	1:7,000	16	94.12
J		17	NF 180	1:8,000	13	76.47
K		17	NF 185	1:7,000	16	94.12
L		17	NF 153	1:3,000	14	82.35
M		17	NF 180	1:4,000	15	88.24
N		17	NF 185	1:3,000	15	88.24

*See table 1 for chemical names of drugs used.

tested over other agents used successfully against blackhead at the present time.

SUMMARY

1) Two hundred and thirty-two turkey poults were exposed to artificial blackhead infection and treated both therapeutically and prophylactically with six nitrofuran compounds at arbitrary dosage levels.

2) N-(5-nitro-2-furfurylidene)-1-amino hydantoin (NF 153) showed some slight promise as a therapeutic agent against blackhead in 1:3,000 concentration in the feed.

3) N-(5-nitro-2-furfurylidene)-3-amino-2-oxazolidone (NF 180) had a small degree of prophylactic value when used continuously in the feed at 1:8,000 concentration from two days prior to infection with blackhead.

4) The effect produced by NF 153 and NF 180 in combating enterohepatitis under the conditions of this experiment warrants further investigation using higher concentrations of these drugs.

5) There was no evidence offered in this experiment that the nitrofurans tested might be superior to other available agents currently used to combat blackhead.

As far as can be determined, chickens do not worry about the palatability of their feed, as they are sensitve only to sight sensations. There is no evidence that they have a sense of taste or smell.—*Feed Bag, Jan., 1953.*

Infectious Bronchitis in Chickens

The University of Illinois recently announced a novel program for combating infectious bronchitis in chickens. This disease causes death losses in chicks and broilers and serious production losses in hens. To combat its recent increased incidence in Illinois, live infectious bronchitis virus will be distributed to coöperating flock owners for the inoculation of 2- to 4-month-old chickens. Vaccination at this age causes the least damage and immunizes them before they commence laying.

The virus will be released only in areas where the majority of stock owners agree to use it as follows: (1) not when susceptible adults or young chicks are present; (2) not when the flock is in egg production; (3) when no signs of other diseases are present; (4) when not in contact with neighboring flocks; (5) not when a previous attack has given them a positive neutralization test; (6) only when there has been previous infection in their territory. Before issuing the vaccine, the owner is requested to bring 2 chickens to the College of Veterinary Medicine with a letter requesting a neutralization test.

The virus is to be administered intranasally to 10 per cent of the chickens and they will then infect the others by contact. Respiratory symptoms should occur two to six days after inoculation. The owner is requested to send a card to the College of Veterinary Medicine two weeks after inoculation stating what symptoms have been observed.

Death from Psittacosis

During the week beginning Nov. 16, 1952, a dealer received a consignment of birds from Australia at the London airport. He became ill and went to bed on November 23 and died from virus pneumonia on December 4. The psittacosis virus was isolated from the victim's blood and tissues. The disease is transmitted most commonly by the inhalation of infected dust from the birds.

The ban on the importation of parrots and cockatoos, which had operated since 1920, was lifted early this year. There were 190 birds in the consignment from Australia and altogether 58 died. The deaths had been attributed to the length of time taken on the journey from Australia. No autopsies or examinations of the birds were made except for the routine veterinary inspection twice a week. The virus carried by British birds is not so prone to cause serious disease as is that carried by foreign birds.

Correction

An abstract on "killed virus vaccine for newcastle disease" (*see* JOURNAL, Jan., 1953:36) was incorrectly credited to Storrs, Conn., where the original had been released, rather than to Lewis and Gilman, Philadelphia, who produced the release.

The favorable statement about the value of killed virus vaccine for Newcastle disease was quoted from a report made by Dr. E. F. Waller, of the University of Delaware, to a meeting of the Poultry Science Association at Storrs, Conn., on Aug. 14, 1952.

The statements reported were those of Dr. Waller and not of the Storrs Experiment Station, University of Connecticut.

Sulfisoxazole—Some Aspects of Its Pharmacology in Dairy Cattle

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THE PURPOSE of this study was to determine the blood and urine levels of free sulfisoxazole (3,4 dimethyl-5-sulfanilamido-isoxazole) in cattle following a single intravenous or oral dose. It was felt that such information would be valuable to the practitioner in evaluating this drug for clinical use, as well as serving as a comparison for the other clinically used sulfonamides.

EXPERIMENTAL

The animals used were heifers or mature cows ranging in weight from 900 to 1,350 lb. All but 2 were Holstein-Friesians.

The sulfonamide was administered at the rate of 1.5 gr. per pound of body weight (214 mg./kg.), intravenously or orally, as a single dose. Oxalated blood samples were drawn prior to administration and then at one, two, four, six, nine, twelve, eighteen, and twenty-four hours post-administration.

The free sulfonamide content of these blood samples was determined according to the method of Bratton and Marshall.[1]

This particular sulfonamide, as compared with sulfanilamide, is not completely recovered from whole blood. To ascertain this, equal quantities of blood were taken from 10 different cows and pooled. To this pooled sample known amounts of sulfisoxazole were added, and the sulfonamide content determined by the standard procedure. The recoveries obtained are shown in table 1. The values represent an average of three to eight determinations each done in replicates of three.

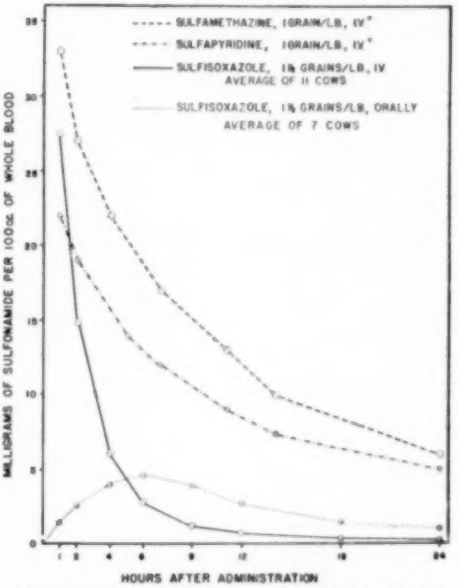
The over-all average recovery rate from whole blood, in concentrations ranging from 1 to 30 mg./100 cc., was 87.3 per cent. This value was used in calculating all blood levels of sulfonamides in this report.

In the case of urine, no such problem presented itself since the method of determination accounts for virtually all of the sulfisoxazole present.

Urinary excretion was determined in the following manner: The volume of each urine sample throughout the 24-hour period was measured and recorded, and a 10-cc. portion of this was retained for determination of sulfisoxazole. By multiplying the concentration of drug in each sample by the volume of that sample, the quantity of free drug was calculated. Summation for the 24-hour period gives the total urinary excretion for that period. Furthermore, the cumulative urinary excretion over any time period can be readily calculated. Due to the difficulty of collecting every bit of urine over a 24-hour period, the figures which are presented for cumulative percentage excretion should be taken as approximations and not as precise values. They are probably low. On the other hand, the values for concentration of drug in the urine at varying times are felt to be reasonably accurate.

RESULTS

When administered intravenously in doses of 1.5 gr. per pound (214 mg./kg.), the blood levels of sulfisoxazole are initially high but decrease rapidly after a few hours.


SULFAMETHAZINE, 1GRAIN/LB, IV*
SULFAPYRIDINE, 1GRAIN/LB, IV*
SULFISOXAZOLE, 1½ GRAINS/LB, IV
AVERAGE OF 11 COWS
SULFISOXAZOLE, 1½ GRAINS/LB, ORALLY
AVERAGE OF 7 COWS
MILLIGRAMS OF SULFONAMIDE PER 100cc OF WHOLE BLOOD
HOURS AFTER ADMINISTRATION

*Jones, L. M., Smith, H. A., and Roepke, M. H.: The Effects of Large Doses of Various Sulfonamides Injected Intravenously in Dairy Cattle. Am. J. Vet. Res., 10, (1949):318.

Graph 1—Comparative sulfonamide blood levels in cattle.

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When given orally at the same dosage, blood levels gradually increased to a peak six hours after administration and then gradually decreased. Tables 2 and 3 give the data on blood levels in cattle following intravenous and oral administration, respectively. The term "standard deviation," which is included in these tables, is an indication of the "scatter" or dispersion of a set of observed values about the average or central value. The term "95 per cent confidence limits" indicates the range of values within which one would expect 95 per cent of all randomly selected subjects to fall. For example, in table 2, at six hours post-administration, 95 per cent of all normal cows selected at random should show blood levels ranging from 1.1 to 4.5 mg./100 cc. of whole blood.

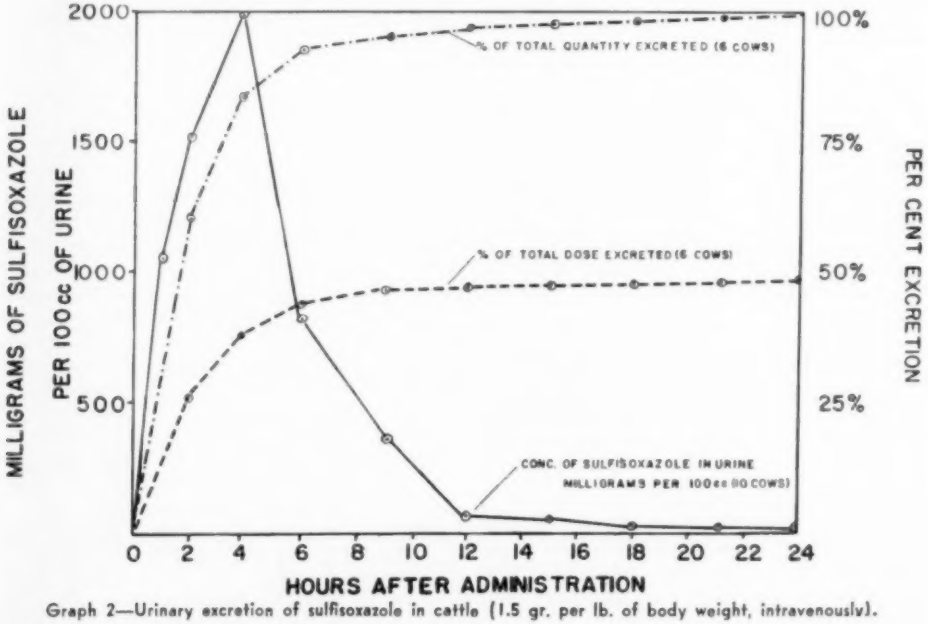
TABLE 1—Recovery of Sulfisoxazole from Whole Blood

Known amount of sulfisoxazole added mg./100 cc.	Sulfisoxazole present in filtrate	
	mg./100 cc. of whole blood	Percentage of recovery
1.0	0.89	89.0
3.0	2.66	88.8
5.0	4.43	88.5
10.0	8.63	86.3
20.0	16.8	84.1
30.0	26.2	87.2
Average recovery = 87.3 per cent		

The blood levels following intravenous and oral administration are summarized in graph 1. For comparison, blood levels of sulfamethazine and sulfapyridine are also shown.

In addition to the above, 6 cows, not included in this report, were given intravenous doses of 1 gr. per pound of body weight. The only difference noted was that blood levels were slightly lower throughout the 24-hour period. Otherwise, the same pattern of rapid decline was observed.

Urinary Excretion.—Following intravenous administration of 1.5 gr. per pound of body weight, intravenously, the rate of urinary excretion is very high for the first few hours, reaching a peak at about four hours and then rapidly declining. From the twelfth to the twenty-fourth hour, urine levels of free sulfisoxazole gradually decrease from a value of about 60 mg./100 cc. to a value of about 20 mg./100 cc. at twenty-four hours. It should be pointed out that although individual cows vary from the average, each animal exhibited the same pattern of urinary excretion.



Graph 2—Urinary excretion of sulfisoxazole in cattle (1.5 gr. per lb. of body weight, intravenously).

The percentage of the dose which is excreted in the urine in the free form increases rapidly during the first six hours and then levels off, reaching an average (6 cows) of 47 per cent in twenty-four hours. Likewise, the percentage of the total *quantity* which is excreted in twenty-four hours increases rapidly for the first six hours and then levels off. The data on urinary excretion is summarized in graph 2.

hours, and from then on gradually decrease throughout the remainder of the 24-hour period.

Urinary excretion of this drug in cattle is apparently rapid during the six-hour period after administration, as examination of graph 2 will reveal. For example, by six hours after administration, about 43 per cent of the dose had been excreted in the urine as free sulfisoxazole. Likewise, during this same period, about 94 per cent of the

TABLE 2—Blood Levels of Sulfisoxazole in Cattle (1.5 gr. per Pound Intravenously, All Values in mg./100 cc. of Whole Blood)

	Cow No.	883	841	777	817	846	808	868	119	229	230	820	Ave.	Std. dev.	95% confidence limits
Time	1	28.6	26.3	20.6	21.7	19.6	35.4	31.2	24.3	32.7	30.6	31.0	27.5	5.31	16.9-38.1
in	2	12.6	16.0	10.7	9.6	8.2	17.4	15.0	—	21.0	17.1	19.9	14.8	4.35	6.1-23.5
hours	4	4.6	5.5	3.7	4.8	4.1	6.7	9.8	5.4	8.5	7.2	7.0	6.1	1.91	2.3- 9.9
after	6	2.1	2.7	1.6	2.1	1.8	2.5	4.2	3.2	3.8	3.2	3.4	2.8	0.85	1.1- 4.5
adminis-	9	0.9	0.9	1.1	1.0	0.9	1.3	1.7	2.1	1.5	1.3	1.3	1.3	0.38	0.5- 2.0
tration	12	0.8	0.5	0.9	0.6	0.6	0.7	1.4	1.2	0.8	0.6	0.7	0.80	0.28	0.2- 1.4
	18	0.5	0.2	0.0	0.3	0.3	0.5	0.5	—	0.5	0.4	0.5	0.37	0.16	0.0- 0.7
	24	0.3	0.0	0.0	0.2	0.2	0.0	0.0	0.1	0.3	0.3	0.3	0.16	0.14	0.0- 0.4

Acetylation.—Considerable difficulty was encountered in determining acetylation of sulfisoxazole, due presumably to instability of acid filtrates. In urine, however, an average value of 26 per cent of the total was present in the acetylated form.

DISCUSSION OF RESULTS

As can be seen from the tables and graphs, sulfisoxazole, when given intravenously in doses of 1.5 gr. per pound of body weight, produces initially high blood levels, but these decrease rapidly so that at the end of four to six hours blood levels are below the commonly accepted minimum effective therapeutic level of 5 mg./100 cc. of whole blood. In the case of oral administration at the same dosage, blood levels gradually increase to a peak level of 4 to 5 mg. of the drug per 100 cc. of blood at six

total quantity excreted in twenty-four hours had been lost in the urine. These observations, in all likelihood, explain the rapid disappearance of the drug from blood following intravenous administration, since it will be seen from graphs 1 and 2 that the period of most rapid excretion of the drug corresponds to the period of most rapid depletion of blood levels. Aside from this, however, the excretion of the drug in high concentrations through the kidney would probably be of value in the treatment of urinary tract infections caused by susceptible organisms. This, in fact, seems to be the case, based on clinical reports appearing in medical literature.[2,3]

CONCLUSIONS

1) Sulfisoxazole, when administered to

TABLE 3—Blood Levels of Sulfisoxazole in Cattle (1.5 gr. per Pound Orally, All Values in mg./100 cc. of Whole Blood)

	Cow No.	169	807	883	820	054	739	841	Ave.	Std. dev.	95% confidence limits
Time	1	1.0	3.2	2.1	0.8	0.9	1.0	1.3	1.5	0.88	0.0-3.3
in	2	1.7	4.7	2.9	1.6	1.8	2.9	2.2	2.5	1.09	0.3-4.7
hours	4	2.7	5.1	—	3.5	3.7	5.3	3.4	4.0	1.03	1.9-6.1
after	6	3.2	4.8	4.8	4.8	5.0	5.5	4.1	4.6	0.74	3.1-6.1
adminis-	9	3.4	2.5	3.8	4.6	4.0	4.9	4.0	3.9	0.79	2.3-5.5
tration	12	2.1	1.9	2.5	3.4	2.5	2.9	3.8	2.7	0.69	1.3-4.1
	18	1.0	1.0	1.5	1.9	1.0	—	1.7	1.4	0.41	0.6-2.2
	24	0.8	0.9	1.0	1.6	0.7	1.3	1.3	1.1	0.32	0.4-1.8

cattle intravenously at a rate of 1.5 gr. per pound of body weight, maintains concentrations in blood of 5 mg./100 cc. of blood, or greater, for about four to six hours.

2) When administered orally, sulfisoxazole reaches its maximum blood concentration of 4 to 6 mg./100 cc. of blood in about six hours and then gradually declines.

3) Following intravenous administration, sulfisoxazole is very rapidly excreted in the urine. The significance of this observation from the standpoint of urinary tract infections is briefly mentioned.

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[2]Stewart, B. L., and Lash, J. J.: The Clinical Use of NU-445 (Sulfisoxazole) in the Treatment of Urinary Tract Infections. A Report of 100 Cases. J. Urol., *64*, (1950): 801.

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Immunizing Dogs for Leptospira

A vaccine composed of formolized liver and spleen of guinea pigs at the height of reaction to *Leptospira icterohaemorrhagiae* failed to protect other guinea pigs. A formolized culture vaccine, prepared from a six- to 24-day growth in Studar's medium, protected guinea pigs and dogs against experimental inoculations.

Formalin does not destroy the antigenic property in culture but does with infected tissue emulsions.—*Vet. Bull., Nov., 1952.*

Leptospirosis often caused quick deaths in nursing beef calves about 2 months old. This is about the age that they commence to browse and drink from pools.—*J. A. Howarth, D.V.M., Davis, Calif.*

In testing for bovine leptospirosis, the agglutination-lysis test gives many false positive reactions, the complement-fixation test gives no false positives.—*James Baker, D.V.M., Ithaca, N. Y., at the Intermountain V.M.A. Meet.*

When Moving, Advise the AVMA

Scrapie Denied in Australia

Although the neurosis disease of sheep called "scrapie" was imported into Australia in January, 1951, it no longer exists there. Only 4 Suffolk ewes were affected, all from that imported lot. The disease was diagnosed in February, 1952, and all the imported sheep were destroyed. All other contact sheep were slaughtered and the paddocks involved have been kept empty of stock for a year.

Swine fever (hog cholera) was confirmed on one farm near Auckland, New Zealand, in January, 1953. Eradication was undertaken by strict quarantine and slaughter of all infected animals.—*Circularaire, Off. Internat. des Epizoöt., Jan., 1953.*

Scrapie was diagnosed in 19 sheep on two central California farms. They were properly disposed of and the balance of the flocks were slaughtered and processed. Young rams had been sold to about 50 other flocks. These rams were traced and destroyed, the ewes they had bred were slaughtered, and the flocks will be carefully observed for three years.—*J. E. Stuart, D.V.M., Sacramento, Calif.*

For a diagnosis of scrapie, send to the laboratory the brain stem, pons, and cervical cord in 10 per cent formalin solution. A diagnosis is made by finding a peculiar vacuolation of large nerve cells.—*C. L. Davis, Denver, Colo.*

Scrapie, because of its slow incubation period, seldom affects sheep less than 1 year old. Cases are usually 2½ or 3 years old. Death may occur in about one or two months.—*J. E. Stuart, D.V.M., Sacramento, Calif.*

State authorities in the Rocky Mountain area report that *Vibrio fetus* infection is causing more concern than all other sheep diseases combined. Through abortions, it has caused the loss of between 50 and 100,000 lambs in the past year or two.

Shipping fever has, in recent years, been responsible for more mortality in cattle than any other disease. Its full etiology is not yet understood.—*Rue Jensen, D.V.M., Fort Collins, Colo.*

NUTRITION

Urea—Feed with Care

Urea in its crystalline form resembles salt and contains 42 per cent nitrogen, which is as much as 6.4 lb. of 41 per cent soybean or cottonseed meal contains. That used for feeding is a synthetic product made from carbon dioxide and ammonia. It is also used as a fertilizer and in manufacturing plastic. Urea is not a protein but the bacteria of the rumen can synthesize proteins from it plus available carbohydrates. This can not be done by swine, poultry, or other animals with a simple stomach.

Ruminants do not use urea efficiently on a poor ration. It is used more effectively in the presence of starches from grain than with the sugar from molasses. When too much urea is consumed it can be toxic, although there is a considerable spread between the toxic level and that recommended for feeding. When fed, it should be carefully mixed with the feeds since deaths in cattle have resulted from improper mixing. Concentrate mixtures should not contain more than 2 to 3 per cent of urea. It is best used for feeder cattle, dry cows, and growing heifers.

Results from feeding it to dairy cows vary. In some cases, feeding more than 3 oz. of urea per day per cow lowered milk production. It is of value only when added to rations which are low in proteins. It can be fed economically only when the cost of 1 lb. of urea plus 6 lb. of carbohydrate is less than the cost of 7 lb. of protein concentrate.—*Hoards' Dairyman, Feb. 10, 1953.*

Where to Put the Salt

It has long been customary to place the salt for livestock near the watering place. After a study, Nebraska experimenters suggest that it would be better placed where they feed. Cattle seem to prefer their salt with their food. The interval between licking salt and drinking water is often about seven hours. Animals can be encouraged to graze certain areas by placing salt there. It is also reported that instead of grazing with the wind in the winter and into the wind in summer, cattle graze about 90 per cent of the time across wind.—*Exten. News Serv. (Nevada), Feb. 2, 1953.*

Synthetic Milk for Pigs

Raising baby pigs on synthetic milk has not always proved satisfactory but, judging by past experience, the following suggestions are made by authorities: (1) Except in the case of orphans, never take pigs from the sow before they are 3 days old because the pigs need colostrum. It is much better, however, to leave them with the sow until they are 7 to 14 days old.

2) Scouring has been aggravated by feeding mixes containing 15 to 20 per cent solid; it is recommended therefore that they be diluted to only 7 to 10 per cent solids.

3) Pigs weaned from synthetic milk at 3 to 4 weeks of age seem to do as well as those weaned later. By that time they should be accustomed to starter feed which then should suffice. The temperature of the synthetic milk should be constant, either always warm (70 to 80 F.) or cold (40 F.). —*Country Gentleman, March, 1953.*

New Hematonic for Baby Pigs.—A new, handy product containing iron, cobalt, and essential B vitamins in a toothpaste-like tube is now on the market. It can be given either directly into the pig's mouth or placed upon the sows teats at weekly or shorter intervals.—*Allied Vet., Jan., 1953.*

Folic Acid Deficiency in Lambs.—Newborn lambs maintained on a "synthetic milk" diet deficient in folic acid developed leukopenia and diarrhea, followed, in most cases, by pneumonia and death. White cell regeneration was induced by giving folic acid.—*Vet. Bull., Nov., 1952.*

Antibiotics in the feed will increase the growth rate of young calves but, if continued, the advantage is eventually lost since the antibiotics interfere with ruminant digestion.—*D. E. Jasper, D.V.M., Davis, Calif.*

EDITORIAL

That Cholera Vaccinating Conundrum Again

Why must things become so complicated? In the good old days (prior to 1949) hog cholera vaccination was a relatively simple, although often a strenuous and sometimes an unpleasant, job. The chief requirements for success were a keen eye for an ailing or unthrifty animal, quick and accurate judgment of weight, plenty of good serum and virus, and ample help. Now one has to burn the midnight oil studying literature concerning nearly a dozen products and various methods of using them in an attempt to immunize swine against cholera without embarrassing aftereffects.

Analyses of data compiled from questionnaires which had been sent to part of the general practitioners in the cornbelt were published in the JOURNAL (May, July, 1952). With the approach of the 1953 vaccinating season, a more comprehensive questionnaire was sent to all general practitioners in three scattered, typical, swine-raising states—Georgia, Indiana, and Iowa. The data derived from these questionnaires are presented here in four tables.

Table 1 shows, on a percentage basis, how extensively the various available products and methods had been used in each of the three states in the past year; also what percentage of the swine vaccinated by each method developed a postvaccinational reaction and how many died during that reaction. It also shows the relative number in each group of supposedly immune hogs which later died from "breaks" diagnosed as cholera. It should be recognized that some of these unfortunate occurrences can not be charged to the vaccination nor to the product used, but this is probably just as true in the case of one product as of another so that the over-all picture, if not accurate, is at least highly indicative.

Points of interest in addition to variations between the three states are: (1) the number of unweaned pigs which are now being vaccinated although most of them were more than 6 weeks old; (2) the smaller percentage of reactions and reaction losses in the unweaned pigs; (3) the indication that "virus breaks" are less frequent in young pigs vaccinated while nursing than in older pigs which were weaned

TABLE 1—Summary of Results of Hog Cholera Vaccinations as Reported in the Questionnaire Sent to General Practitioners in Georgia, Indiana, and Iowa

	METHOD I—VIRULENT VIRUS + SERUM Simultaneous											
	Total	Unweaned pigs				Weaned pigs				Delayed virus		
	Pigs vac. method I (%)	Pigs vac. method I (%)	Pigs reacting (%)	Loss from reaction (%)	Later break loss (%)	Pigs vac. method I (%)	Pigs reacting (%)	Loss from reaction (%)	Later break loss (%)	Pigs vac. (%)	Loss (%)	Sick days after vaccination
Georgia	45.6	24	0.24	0.08	0.26	76	0.15	0.07	0.05	0.2	0.0	....
Indiana	71.0	46	0.29	0.10	0.02	54	0.85	0.23	0.07	0.9	0.36	9-21
Iowa	82.2	44	0.08	0.03	0.02	56	0.18	0.05	0.05	0.5	0.79	6-8
Ave. for 3 states	78.0	42	0.13	0.04	0.02	58	0.31	0.08	0.05	0.5	0.60	

	METHOD II ATTENUATED VIRUS VACCINE			METHOD III MODIFIED VIRUS VACCINE + SERUM				METHOD IV LAPINIZED VIRUS VACCINE						
								Without serum				With serum		
	Pigs vac. (%)	Later loss (%)	Weeks after vac.	Pigs vac. (%)	Pigs reacting (%)	Reaction loss (%)	Later break loss (%)	Pigs vac. (%)	Pigs reacting (%)	Loss from reaction (%)	Later break loss (%)	Pigs vac. (%)	Reaction loss (%)	Later break loss (%)
Georgia	2.4	0.35	2	45.4	0.29	0.15	0.93	6.4	4.2	1.62	1.32	0	0	0
Indiana	1.5	1.60	5-12	19.0	0.52	0.14	0.03	7.3	1.84	1.06	0.33	0.3	0	0
Iowa	3.7	0.53	½ — less than 3	8.0	0.58	0.12	0.15	5.4	2.26	0.54	0.13	0.2	0.03	0.14
Ave. for 3 states	3.3	0.63		12.0	0.51	0.13	0.24	6.0	2.40	0.76	0.23	0.2	0.03	0.1

before being vaccinated; (4) the fact that postvaccinational losses do occur rather frequently after the delayed virus method, probably because this method is usually used only in ailing herds; (5) the absence of any immunity breaks after the delayed virus method (however, the number reported is too small to be significant); (6) the higher ratio of immunity failures (virus breaks) in all other methods than when virulent virus was used; (7) indications that reactions seemed to be more frequent in 1952 after vaccinating with modified virus plus serum than with virulent virus plus serum; and (8) the indication that reactions are more frequent following the use of lapinized vaccine without serum than with any other method. Few cholera breaks were reported in swine vaccinated with lapinized vaccines plus serum but the number reported on is too small to be significant. The reported postvaccinational reactions and deaths following the use of virulent virus with serum are remarkably infrequent but many reported that 1952 had been exceptionally free of such troubles.

When virus was delayed, it was injected from the second to the fourth day after the serum in 2 per cent of the herds; on the fifth or sixth day in 22 per cent; on the seventh day in 63 per cent; and on the eighth to tenth day in 13 per cent. The postvaccinational illness seemed to bear no relation to the day the virus was administered.

TABLE 1A—Summary of Reactions and Mortalities Shown in Table 1

For every 10,000 pigs vaccinated (= 100 herds of 100 pigs each) by: Method	Reacted	Died during reaction	Died from later break
I (Serum & virus) while nursing	13	4	2
I (Serum & virus) after weaned	31	8	5
I (Serum & virus)—delayed virus	?	60	0?
II (Attenuated virus vaccine)	0	0	63
III (Modified virus vaccine + serum)	51	13	24
IV (Lapinized virus vaccine)	240	72	23
V (Lapinized virus vaccine + serum)	?	3	10

Table 2 compares the relative number of swine vaccinated with each type of product in 1952 (plus the fall of 1951 for the new products) with the relative numbers which practitioners anticipate they will vaccinate by the same method in 1953, provided they can obtain the desired biological supplies.

In spite of the fact that many reports expressed concern over the frequent reactions and the possibly less certain immunity of the newer methods as compared to the old simultaneous method, they also reveal a considerable planned reduction for 1953 in the use of the old method. In each state the expected reduction is about 20 per cent. With a smaller hog crop predicted for 1953 and a higher percentage of vaccinations with modified vaccines, the short supply of serum may prove adequate unless the disease is unusually prevalent.

The greatest indicated shift is to the modified vaccines plus serum. The indicated increase in the use of the old chemically attenuated vaccines is too small to be significant. There is significance, however, in the disinclination of Georgia practitioners to increase their use of lapinized vaccines without serum. In late 1951, one brand of lapinized vaccine was quite extensively tried in that state with results which often were very unsatisfactory. Many from all states who expect to use more of the lapinized vaccines indicate that they will use it simultaneously with serum.

TABLE 2—Methods of Vaccination Used in 1952 and Planned for 1953

	I Virulent virus + serum		II Attenuated virus		III Modified virus + serum		IV Lapinized virus + or − serum		New product
	'52	'53	'52	'53	'52	'53	'52	'53	1953
Georgia	45.8	37	2.4	2.5	45.4	54.0	6.4	6.5	0
Indiana	71.9	57	1.5	2.0	19.0	26.0	7.6	14.5	0.5
Iowa	82.7	67	3.7	4.3	8.0	18.7	5.6	8.5	1.5

While lapinized vaccines used alone show

TABLE 3—Comparison of Losses of Swine Vaccinated by Veterinarians and Non-Veterinarians

	Veterinary vaccinated			Non-veterinary vaccinated			
		All methods		All methods	Percentage of loss after		
	No. reports	Ave. pigs vaccinated per report	Ave. loss per report (pigs)	Ave. loss per report (pigs)	Virus + serum	Attenuated vac.	Lapinized vac.
Georgia	25	5,678	45	99.6	17.6	3.4	79.0
Indiana	72	9,632	30	40.1	85.0	3.0	12.0
Iowa	133	18,286	26	82.4	74.0	9.0	17.0
3-states	230	.....	29	71.2	70.0	7.5	22.5

at a disadvantage in this report, it should be remembered that they still are being improved and in the future they may do better.

Table 3 compares the losses reported as occurring in the reporter's own practice with those he reported as occurring in the same territory in swine vaccinated by nonveterinarians. While the latter figures presented make no pretense of being accurate, they could be reduced considerably and still be very significant. Approximately 70 per cent of the hog cholera antiserum is produced by companies which supply veterinarians only, so that in these states there should be at least twice as many hogs vaccinated by veterinarians as by laymen. This report therefore indicates that postvaccinational losses are about five times as great when pigs are not vaccinated by veterinarians.

The losses reported may have been exaggerated occasionally by having the same herd reported by two veterinarians, or because of incomplete secondhand information, or for other reasons. On the other hand, many practitioners who mentioned losses from lay vaccination declined to give figures, since they preferred to report only what they had personally observed.

This again presents the delicate question of what can be done to curb the use and abuse of virulent hog cholera virus. As has been repeatedly stated, hog cholera is the only highly contagious disease of animals known to be present on this continent, which has both a morbidity and a mortality of nearly 100 per cent in nonimmunized swine. Yet that deadly virus is carefully bottled and delivered to almost anyone, almost anywhere, to be used often without understanding supervision and obviously is bound to set up many new foci of the disease.

With the present amply justified concern about the dissemination of vesicular exanthema and other swine diseases, including hog cholera, through the feeding of uncooked pork scraps in garbage, it seems ultra inconsistent that the spotlight not also be turned on the greatest source of a disease which is incomparably more destructive than vesicular exanthema.

Virulent hog cholera virus can and will occasionally produce the disease even in the hands of the most careful and well-trained operator, but in the hands of a novice with little or no training or information about its dangers, it is extremely hazardous. If hog cholera is ever to be curbed or eradicated, the first step should be the removal of virulent virus from untrained hands.

Many interesting comments were returned with the questionnaires. As would be expected, there were champions for all methods but the most frequent comment was that the old simultaneous method gave the strongest immunity and that, if the pigs were vaccinated well before weaning, there would be little trouble. We hope some information of value may be derived from this survey.

Vesicular Exanthema Controls to Be Stepped Up

The eradication of vesicular exanthema, which has been hopefully sought for the past nine months on a limited emergency basis, is now to be more vigorously pursued. On March 2, 1953, the disease had spread until quarantines were in force in 22 states making a total of 37 states now or previously involved. Many hogs have shown symptoms of V. E. on arrival at their shipping destination with the source of their infection in doubt. However, when traceable these infections usually prove to have originated in garbage-fed hogs.

Because of failure of the present control methods an advisory committee to the Secretary of Agriculture met, on February 28, with Under-Secretary True D. Morse to discuss measures for strengthening eradication procedures. The committee of fourteen advisors included Drs. George Gillie, Fort Wayne, Ind., Ralph Hendershott, Trenton, N. J., H. E. Kingman, Jr., Chicago, and C. D. Van Houweling, Chicago. Earlier meetings of U.S.D.A. officials and other groups interested in the nation's livestock problems had been held in Chicago on February 16 and 17.

The discussion at Washington centered chiefly on the steps which must be taken to prevent the feeding of uncooked garbage to hogs, to control the movement of hogs fed raw garbage, and to secure the adequate disinfection of all vehicles and equipment used in the transportation of swine.

Briefly, in addition to the quarantine, slaughter, processing, and disinfection pro-

cedures previously in use, the following recommendations were made:

1) The interstate movement of swine, or swine products not specially processed, be prohibited if vesicular exanthema exists or is believed to exist in the state, unless the infected or exposed swine are in strict quarantine.

2) The state must (*a*) maintain a 24-hour a day quarantine; (*b*) require and supervise, within seven days of the diagnosis, the slaughtering and burial or special processing of all infected or exposed swine; and (*c*) by systematic inspection, ascertain that all garbage is adequately cooked before coming in contact with the swine and that V. E. has not occurred on the premises.

3) Garbage-fed swine must be moved only under state supervision and only after it is certified that V. E. was not present prior to shipment. In addition, swine which were fed uncooked garbage must be moved only in sealed vehicles for immediate slaughter and special processing (boneless parts heated to 156 F. momentarily or 145 F. for fifteen minutes; parts containing bones to an internal 156 F. for fifteen minutes).

4) Vehicles and equipment used in transporting any swine must be cleaned and disinfected immediately afterwards and again before used for swine if it has been used by any other livestock.

5) Stockyards, sale barns, rest stations, etc., suspected of handling infected or exposed swine must be cleaned and disinfected under state or federal supervision.

Thus, if any state fails to adequately control and promptly eradicate V. E. within its borders, no swine or swine products can move across its boundary without special permission by the chief of the Bureau of Animal Industry.

The approval of this proposed program by the Secretary, and by the states, should encourage the states which have not vigorously pursued an eradication program, by the threat of an embargo, to take more positive action.

The above Advisory Committee also adopted resolutions:

1) Dedicating the committee and department to the eradication of vesicular exanthema;

2) Requesting the department to prepare a circular to be sent to all states urging the adoption of actions authorizing state governments to control the feeding of garbage to swine;

3) Recommending that legislation be introduced to broaden and clarify the authority of the federal government in eradication of V. E.;

4) Urging the department to use every possible means to inform and interpret to all segments of the industry the need for and possible eventual effect of the new regulations; and

5) Recommending that indemnities not be paid after July 1, 1953, for swine fed raw garbage.

Scrapie Reported in Three States

The virus neurosis disease of sheep known as scrapie is reported to have been recently diagnosed in three flocks in Ohio and one flock in Illinois. Its diagnosis in California in October, 1952, was its first publicly recognized appearance in this country although it is thought to have appeared in another state near the Canadian border following their outbreak several years ago.

Eradication measures, with the slaughter of 900 sheep, have been carried out in California. In Ohio and Illinois all diseased sheep have been slaughtered, the premises quarantined, and past movements of animals from these to other flocks are being traced. Because of the slow incubation period—several months to three years or longer—sanitary officials in all states should remain on the alert for the disease for several years.

More Twin Calves for Experiments

Experiments with identical twin calves have been so encouraging that the U. S. Bureau of Animal Industry plans to purchase a third group. Feeding experiments were started in 1950 with six pairs and were continued with ten pairs in 1951. One twin receives a limited ration, the other a full ration.

Results of the two feeding trials showed that calves given, for six months, only enough feed to keep them from losing weight will grow rapidly and economically later when on adequate rations. However, their health must be protected while on limited rations. They should get liberal allowances of protein, minerals, and vitamin A.

The Bureau needs twins not more than 4 months old, preferably Aberdeen Angus, Hereford, or Shorthorn breeds. However, grades or crossbreds can be used.

The *Country Gentleman* (Jan., 1953), in answer to a query about Coronado using mules in an expedition in 1540, states that mules were imported into Mexico from Spain in the sixteenth century. It also states that George Washington was recognized as America's first successful breeder of mules.

CURRENT LITERATURE

ABSTRACTS

Effect of Viomycin and Other Agents on Mycobacterium Paratuberculosis

In vitro studies of 4:4' diamino diphenyl sulfone, four thiosemicarbazones, and viomycin indicate that viomycin is the only one of these products that inhibits the growth of *Mycobacterium paratuberculosis* when used in low concentrations. Administered in daily doses not exceeding 35 mg. per pound of body weight over a period of twenty-eight days, 4:4' diamino diphenyl sulfone initially resulted in improvement of 1 cow in an advanced stage of Johne's disease; however, symptoms recurred two and one-half weeks after treatment was initiated and the animal was destroyed as incurable at the end of the 28-day treatment period.—[*A. B. Larsen and T. H. Vardaman: The Effect of Viomycin, 4:4' Diamino Diphenyl Sulfone, and Other Agents on Mycobacterium Paratuberculosis. Am. J. Vet. Res., 13, (Oct., 1952): 466-468.*]

Froth Formation and Acute Bloat in Ruminants

The author has shown that frothing of ruminal ingesta is the main cause of bloat in sheep on green lucerne—the froth forming when rapid gas formation takes place in ruminal ingesta of a thick tenacious consistency. The consistency is influenced by reflex salivary secretion, stimulated by coarse material in the fore-stomachs, which makes the ruminal contents watery.

Succulent lucerne causes frothy bloat due to inadequate stimulation of reflex salivation, whereas stalky lucerne provides sufficient irritation to cause a copious salivary flow.—[*K. E. Weiss: The Significance of Reflex Salivation in Relation to Froth Formation and Acute Bloat in Ruminants. Onderstepoort J. of Vet. Res. In Press.*]—R. W. DOUGHERTY.

Canine Penicillin Blood Levels Obtained with Parenteral Benzethacil

The administration of a single, intramuscular dose of 300,000 units of benzethacil (N,N'-dibenzylethylenediamine dipenicillin G) to medium-sized dogs resulted in a blood serum level usually considered effective for eight to fifteen days. Similar injections of potassium penicillin G resulted in serum levels for twelve hours, and of procaine penicillin G for twenty-four hours.—[*W. C. Glenney, C. F. Batory, and R. A. Huebner: Canine Penicillin Blood Levels Obtained with Parenteral Benzethacil. Am. J. Vet. Res., 13, (Oct., 1952): 555-556.*]

Hemolytic Icterus of Newborn Foals

The blood count of foals was related to the severity and time of appearance of symptoms. The severity of the disease was related to the hemagglutinin and hemolysin titers of the mare's colostrum and also to the quantity of colostrum produced by the mare. First symptoms were noted from twelve hours to ten days after birth. Deaths occurred from twelve hours to nine days. Jaundice cases appeared from the second to twelfth pregnancies of naturally immunized mares. The pathological changes appeared to be related to the severity of the anemia and jaundice and consisted of degenerative and necrotic changes, principally in the liver and kidneys. Early exsanguination transfusion was more effective in treatment than periodic simple transfusions.—[*E. R. Doll: Observations on the Clinical Features and Pathology of Hemolytic Icterus of Newborn Foals. Am. J. Vet. Res., 13, (Oct., 1952): 504-508.*]

Chemotherapy of Enterohepatitis of Turkeys

The comparative value of 2-amino-5-nitrathiazol and 2-acetylaminonitrothiazol in the prevention and treatment of enterohepatitis in turkeys is reported. Exposure to *Histomonas meleagridis* was obtained by the use of litter from a chicken house. The study included two separate experiments and a total of 1,132 turkeys. Both drugs were effective and of about equal value in preventing enterohepatitis when medication was started at the time of exposure and given continuously in an all mash ration at the concentration of 0.05, 0.04 and 0.03 per cent. Neither drug was effective as a treatment if medication was started after an outbreak of the disease had occurred.—[*L. C. Grumbles, W. A. Boney, Jr., and R. D. Turk: Chemotherapy of Enterohepatitis of Turkeys. III. Comparative Value of 2-Amino-5-Nitrothiazol and 2-Acetylalaminonitrothiazol in Prevention and Treatment. Am. J. Vet. Res., 13, (Oct., 1952): 572-574.*]

Corpus Luteum Ablation and Progesterone Replacement Therapy During Pregnancy in the Cow

Progesterone replacement therapy was studied in 18 mature cows subjected to corpus luteum removal during pregnancy. Control cows in which the corpora lutea were removed between the ninety-second and 163rd day of pregnancy aborted promptly in the absence of progesterone replacement therapy. Pregnancy was maintained by the injection of progesterone in 8 of 9 cows in which

the corpora lutea were removed at approximately the sixtieth day of pregnancy. The mean length of gestation of these cows was short and retained placentas occurred in 7 of 8 cows. A total of 100 mg. of crystalline progesterone in sesame oil administered daily was necessary to maintain pregnancy in a high percentage of the cows. In cows in which the corpora lutea had been removed, abortion did not occur when progesterone injections were discontinued as early as the 162nd day of pregnancy.—[*Leslie E. McDonald, R. E. Nichols, and S. H. McNutt: Studies on Corpus Luteum Ablation and Progesterone Replacement Therapy During Pregnancy in the Cow. Am J. Vet. Res., 13, (Oct., 1952): 446-451.*]

Preputial Samples for Diagnosis of Trichomoniasis in Bulls

In 119 preputial samples obtained by the pipette method from 3 infected bulls the average concentration of *Trichomonas foetus* was 7.1 thousand per cubic centimeter, and 34.4 per cent of the samples were negative; for 119 samples obtained by the douche method on alternate days from the same bulls, the corresponding figures were 13.5 and 18.5 per cent. In 62 samples obtained by the swab method from 7 infected bulls, the average concentration of *T. foetus* was 4.2 thousand per cubic centimeter and 8.1 per cent of the samples were negative; for 63 samples obtained on alternate days by the pipette method from the same bulls, the corresponding figures were 20.6 and 6.3 per cent. These results indicate that the douche method is more efficacious than the pipette or swab methods, and that the pipette is more efficacious than the swab method. Limited tests indicate that induction of sexual excitement in the bull immediately prior to sampling is not ordinarily worth-while in routine diagnosis.—[*Paul R. Fitzgerald, Datus M. Hammond, Merthyr L. Miner, and Wayne Binns: Relative Efficacy of Various Methods of Obtaining Preputial Samples for Diagnosis of Trichomoniasis in Bulls. Am. J. Vet. Res., 13, (Oct., 1952): 452-457.*]

Dramamine and the Vestibular Apparatus in the Dog

Dramamine was given orally and by vein to 15 dogs. It was well tolerated in doses ten times that recommended for man. Doses from 20 to 40 mg. per pound of body weight will cause vomiting and increases are toxic. Barany chair rotation was employed to irritate the vestibular apparatus of 36 dogs. The extent of nystagmus was found to be an excellent quantitative measure of vestibular activity. Rotation did not cause motion sickness in dogs. The vomiting threshold was not lowered by continued rotation in one direction or by alternating the direction of the rotation. Dramamine did not affect the extent of vestibular activity nor did it counteract the smallest emetic doses of apomorphine.—[*Marcus M. Mason: Dramamine and the Vestibular Apparatus in the Dog. Am. J. Vet. Res., 13, (Oct., 1952): 549-554.*]

Evaluation of Acid-Fast Allergens on Sensitized Goats

Eleven goats artificially sensitized, 6 with *Mycobacterium tuberculosis* var. *bovis* and 5 with *Mycobacterium paratuberculosis*, were compared with similarly sensitized cattle in the evaluation of chemically fractionated portions of johnin and tuberculin. Measurements of skin reactions resulting from injection of the allergens were compared and the results indicated that goats compare favorably with cattle in evaluating increased specificity of such fractions.—[*Aubrey B. Larsen: The Evaluation of Acid-Fast Allergens on Sensitized Goats. Am. J. Vet. Res., 13, (Oct., 1952): 545-548.*]

Pseudorabies Virus (Aujeszky Strain) in the Rhesus Monkey

The Rhesus monkey (*Macaca rhesus*) was susceptible to the Aujeszky strain of pseudorabies virus by intracerebral exposure. The virus in monkey brain suspensions from the intracerebral series was confirmed to be pseudorabies virus by neutralization tests using guinea pigs as the test host. Monkeys infected intradermally and rectally with this pseudorabies virus showed slight nervous symptoms and some scratching. However, rabbits inoculated with brain suspensions from these animals showed no evidence of infection—[*Reginald L. Reagan, M. P. Harmon, W. C. Day, and A. L. Brueckner: Studies of Pseudorabies Virus (Aujeszky Strain) in the Rhesus Monkey (Macaca Rhesus). Am. J. Vet. Res., 13, (Oct., 1952): 581-592.*]

FOREIGN ABSTRACTS

Anesthesia with Sodium Pentobarbital

In the last seven years, we have used sodium pentobarbital in 125-cc. bottles at a concentration of 1 gr. per cubic centimeter, approximately, with 10 per cent alcohol and propylene glycol. This solution may be used in all species of animals but this report will relate to its use for anesthesia of dogs and cats.

An important and decisive factor in the amount of anesthesia required is the body temperature of the animal. At a normal temperature, a dosage of 1 cc. for each 2½ kg. of body weight is sufficient. If there is lower body temperature due to uremic crises, canine distemper, severe hemorrhage, or shock accompanying trauma, it is necessary to reduce the dosage to produce prolonged anesthesia.

Age also influences dosage. As a general rule, the dosage would be increased in treating young animals and decreased in dosing older animals.

In cats, the intraperitoneal route is preferable, with a dosage of 2 to 2½ cc. in large cats, 1 to 2 cc. in those of average size, and 1 cc. in small ones. It should be pointed out that cats do not always show complete anesthesia and muscular relaxation may not be sufficient for laparotomy; in such cases, other agents may be necessary to depress the animal to deep surgical anesthesia.

When sodium pentobarbital is given intravenously, the rate of injection should be 1 cc. per minute, with close observation of the influence of the drug on the heart; its administration should be stopped if there is over-depression of the heart.

Procaine has been given intravenously in high dilutions for counteracting the influence of pentobarbital on higher centers. Here, procaine injection is stopped immediately at the appearance of new muscular tremors or convulsions.—[*I. Malvido R: Anesthesia with Sodium Pentobarbital. Med.y Cirug. Zootec., 2, (1952): 10-12.*]—G. T. E.

Demodectic Mange

Autopsies of 6 dogs revealed adult mites, larvae, and eggs in the liver, lungs, spleen, lymph nodes, tongue musculature, intestinal wall, and bladder. Systemic and local treatments were tested on 25 affected dogs. The most effective combination was 1 per cent trypan blue, 0.5 to 1 cc. per kilogram, intravenously, and sulfur dust locally. The success of the treatment was judged by the disappearance of the mites from the skin, lymph nodes, and feces. Four dogs were killed for autopsy after treatment. No mites were found.—[*M. F. Guryanova and A. E. Dulebov: New Information on Demodecosis of Dogs and Its Treatment. Veterinariya, 29, (Oct., 1952): 29-33.*]—R. E. H.

Lumbar Epidural Anesthesia

The method produces anesthesia of the left flank for rumenotomy. Only one 10 cc. injection of 4 per cent novocain is required. The needle is inserted on a line just to the right of the summits of the spinous processes, 1.5 to 2 cm. caudal to the plane of the cranial border of the transverse process of the second lumbar vertebra. The needle is inserted at an angle of 10 to 13 degrees from the median plane until the interarcuate ligament is felt, and then inserted 4 to 6 mm. farther. The total depth varies with the size of the animal—from 5.8 to 9.3 cm. When the needle is correctly placed, a slight noise is heard as air enters the epidural space, and no cerebrospinal fluid can be withdrawn with the syringe. Anesthesia develops in four to fifteen minutes and lasts ninety to 165 minutes.—[*I. I. Magda, N. E. Shalduga, and V. M. Voskoboinikov: Some Remarks in Connection with Rumenotomy. Veterinariya, 29, (Oct., 1952): 47-51.*]—R. E. H.

BOOKS AND REPORTS

Veterinary Clinical Pathology

The third edition of the "Manual of Veterinary Clinical Pathology," by David L. Coffin, has been greatly improved over the first paper-backed pamphlet edition.

The first five chapters have been changed very little. This sixth chapter, "Diagnostic Interpretation in Clinical Chemistry," is entirely new and a great aid to the teacher of clinical pathology.

The chapter on hematology includes new features, two-counting-chamber method for erythrocyte counting, and the macroscopic examination of the blood. The range limits in the normal blood cellular elements have been narrowed, especially for the dog, which is a definite improvement.

There have been valuable additions in the chapter on interpretations of hematological findings.

The clinical diagnostician will find valuable help in the discussion of leptospirosis and infectious canine hepatitis because they have been enlarged considerably.

This is the only North American publication of its kind, giving the veterinarian and student a source of information and interpretation on animal diseases and techniques not shrouded by irrelevant material.—[*Manual of Veterinary Clinical Pathology. By David L. Coffin. 322 pages. 73 illustrations. Cornell University Press, 124 Roberts Place, Ithaca, N. Y. 1953. Price $5.50*]—MARGARET W. SLOSS.

Aids to Zoology

This small volume, fourth edition, is primarily intended as review material for certain specialized students in England. In the preface, the author states that new chapters have been added and that information has been brought up to date, which indicates a rather substantial revision.

It is surprising to see what a vast amount of information distributed in many fields is presented in the text. The information varies from simple to very complex. The style is simple and direct, and the text is easy to read. The material in general is well organized and the adequate subheadings as well as the important words or terms in bold print add zest to the reading. The appendix having to do with selected Latin and Greek roots of technical words is certainly a valuable asset, and the words are well chosen. Much information is sacrificed for brevity in some instances and the reader would have to have a comprehensive knowledge of zoölogy in order to understand all parts of the volume. Very little of the terminology is foreign to the American reader, but some is old. There are decided inequalities in the treatment of the phyla. The material on the phylum Mollusca is too brief and leaves one with a poor idea of what either a snail or clam might be. One can justify the omission of some of the

small phyla, but why the phylum Echinodermata was left out is difficult to understand if this book is to be a review of the animal kingdom.

Figures and diagrams vary from fair to good. With space at a premium, one wonders why simple drawings of insect appendages (p. 110, 111) should be given so much space and complex drawings of anatomy of the dogfish and the frog (p. 134, 137) so little.

There are various kinds of errors in the text. No attempt will be made to enumerate all of them, but a number are mentioned. Three names are used for the common liver fluke, *Fasciola hepatica*. The species name of the liver fluke begins with a small letter, while the species name of the pork tapeworm begins with a capital letter, and for no good reason. The heading under contents for chapter 6 is Chaetopoda, but in the text the heading is phylum Annulata, the old name, which, however, may be correct in Europe. Most of the equations in the section under physiology are balanced. Two of the most important ones, however, concerned with the synthesis of glucose and its oxidation are not balanced. In the discussion of embryology, a rather serious typographical error exists, since the animal pole and a "vegetable" pole are mentioned. Much space is devoted to the excretory system of the liver fluke but much of the discussion does not pertain to flukes. Errors are emphasized in a small book of this nature where the text is limited and are, therefore, reasons for concern.

This volume, no doubt, is well fitted for its purpose, but I doubt that it would have a wide usage in this country. It would be interesting to anyone teaching biological subjects, but for students I am quite sure it would have limited value. It abounds, however, with material for both the inquisitive and critical reader, and could be used for a number of purposes.—[*Aids to Zoology. By Harry Lister, M.Sc. 279 pages. Bailliere, Lindall and Cox, 7 and 8, Henrietta St., W.C. 2, London. 1952. Price $2.00*]—WENDELL KRULL.

Annual Review of Microbiology

The sixth volume, 1952, of the "Annual Review of Microbiology" is another commendable member of this well-known series. Among the 21 chapters, one notes the usual topics on bacteria from the standpoint of nutrition, metabolism, soil, and antibiotics. Advances in viruses are discussed from four different aspects: classification, plant, serology, and bacteria. Separate treatment is given to rickettsias, spirochetes, yeasts, nematodes, and mycorrhiza. The book concludes with stimulating surveys on metabolite analogues and chemotherapeutic agents. To the veterinarian, probably the most interesting chapter is the contribution by O. Maaloe and N. K. Jerne on the standardization of immunological substances.—[*Annual Review of Microbiology. Edited by C. E. Clifton. Vol. 6, 492 pages. Annual Reviews, Inc., Stanford, Calif. 1952. Price $6.00*].—CHARLES L. SAN CLEMENTE.

The Pharmacology of Anesthetic Drugs

The author has assembled information from many sources in this syllabus of anesthetics used in human medicine. Data refer to actions on human beings and laboratory animals. The pharmacological facts of importance about the well-known volatile and nonvolatile anesthetic drugs are presented in a fundamental manner. Lesser known volatile and nonvolatile drugs are treated with less detail.

Diagrammatic arrangement of subject matter focuses attention to principal physiological and pathological changes anesthetic agents produce in various organs and systems.

General consideration of anesthesia and anesthetic drugs including physical and chemical properties, absorption, elimination, routes of administration, and toxicity are briefly discussed. Local anesthetics are dealt with in a concise manner including systemic effect, toxicity, and recommended uses of specific drugs. Muscle-relaxing agents, analeptics, and sympathomimetic drugs used in conjunction with anesthetics are also included.

Information on the use of oxygen, carbon dioxide, and nitrogen has considerable potential value to the small animal practitioner.—[*The pharmacology of Anesthetic Drugs. By John Adriani. 179 pages. Illustrated. Charles C. Thomas, Springfield, Ill. 1952. Price $6.00*]—R. P. LINK.

Soviet Virology

Many reports have appeared in the Russian veterinary journal on the alleged transformation of viruses to bacteria. This is hailed as a great revolutionary triumph of Soviet science, as important to the progress of microbiology as the discoveries of Leeuwenhoek. The technique of culturing viruses in bacterial form has never been described, but reference is always made to the work of G. M. Boshyan. This book has been carefully examined in a futile effort to find concrete details of the method. Boshyan says only: "We have established that by the use of methods developed by us, directed toward the disruption of the bond between the virus and the tissue proteins of the host, it is possible to obtain a successful culture of the causative agents of virus diseases."

There is no bibliography in the book. There are two references in footnotes—one to the selected letters of Marx and Engels, and the other to "The Dialectics of Nature" by Engels. One can only conclude that Boshyan's virology follows in the great tradition of Lysenko's genetics.—[*On the Nature of Viruses and Microbes. By G. M. Boshyan, All-Union Inst. of Exptl. Vet. Med. of the Ministry of Agric., U.S.S.R. 147 pages. Medgiz, Moscow. 1950.*]—ROBERT E. HABEL.

THE NEWS

Ninetieth Annual Meeting of the AVMA

Toronto—July 20-23, 1953

Section Programs Complete for Toronto Meeting

The scientific programs arranged for the six sections of the Ninetieth Annual Meeting of the AVMA in Toronto, July 20-23, 1953, will present the broadest possible discussion of all phases and aspects of veterinary medicine. About 150 veterinarians and other scientists from North America and two other continents will participate in presenting the forty-two hours of scientific papers and closed circuit television. Approximately six hours will be devoted to the television programs—including major operations, practice "tricks," and anesthetic and restraint demonstrations.

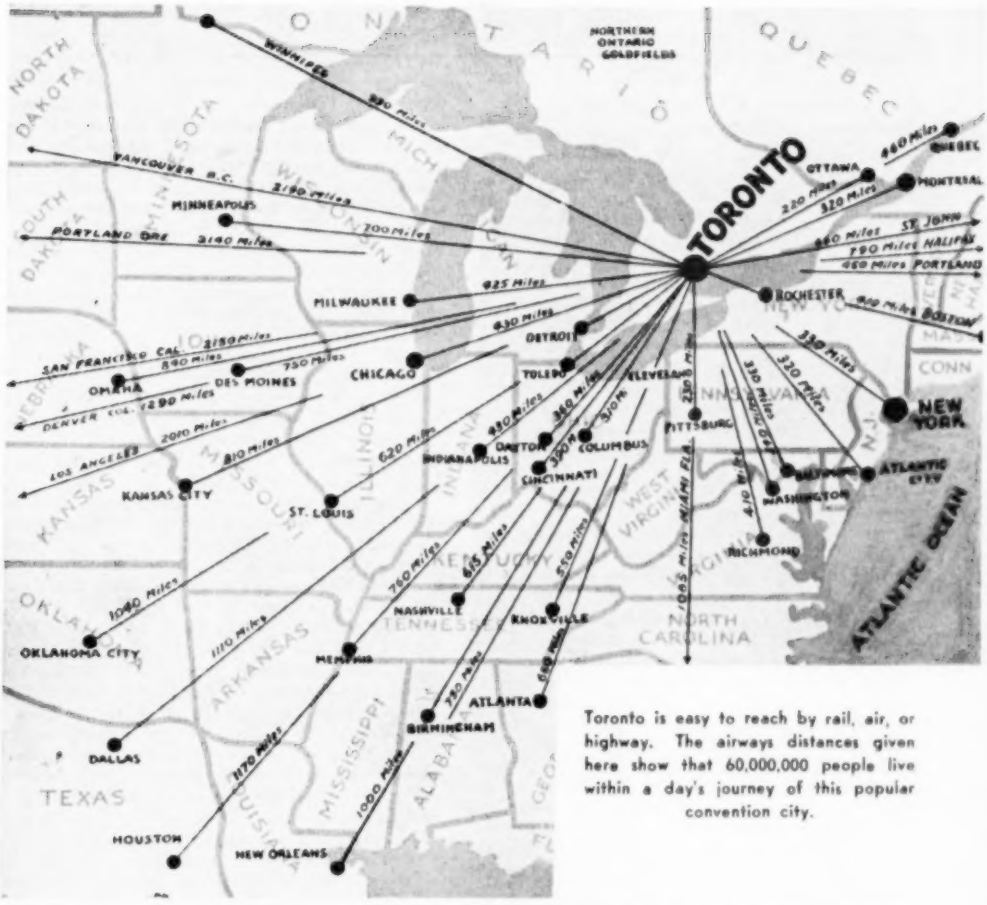
An innovation this year is to allot nine hours to the sections on General Practice and Small Animals. The complete section schedule is as follows:

Monday, July 20, 1:30 to 4:30 p.m.—Sections on General Practice and Research.

Tuesday, July 21, 9:00 to 12:00 a.m.—Sections on General Practice and Research.

Tuesday, July 21, 1:30 to 4:30 p.m.—Sections on

Biguin Inn on Lake of Bays—about 200 miles north of Toronto in the beautiful North Canadian country.



Toronto is easy to reach by rail, air, or highway. The airways distances given here show that 60,000,000 people live within a day's journey of this popular convention city.

Small Animals, Poultry, and General Practice (large animals only).

Wednesday, July 22, 9:00 to 12:00 a.m.—Sections on Small Animals and Poultry.

Wednesday, July 22, 1:30 to 4:30 p.m.—Sections on Surgery and Obstetrics (large animals only), Public Health, and Small Animals.

Thursday, July 23, 9:00 to 12:00 a.m.—Sections on Surgery and Obstetrics and Public Health.

The "practice" sections, General Practice, Surgery and Obstetrics, and Small Animals, will have extremely practical programs at the Toronto convention. The subjects were selected after determining, by a survey, what practitioners wanted discussed at this meeting.

Over 1,000 questionnaires listing a number of subjects were sent to practicing veterinarians in a cross section of states and provinces, asking them to rate the topics they wanted discussed on the various section programs. The fine response to this survey greatly aided section officers in selecting the subjects; when that was done, they then chose the men they considered the best able to discuss them.

For the other three sections, Public Health, Research, and Poultry, the section officers have also arranged outstanding programs. The papers chosen for presentation are a result of a survey of the material available. Practically all phases of research, poultry disease, and public health work will be discussed on these programs. The emphasis in these sections has been primarily on brevity, quality, and breadth of scope. Most papers are fifteen to twenty minutes in length with five minutes allotted for discussion after each paper.

HOTEL RESERVATIONS

The prospect of record attendance at the Toronto session emphasizes the necessity of early requests for accommodations. See and use hotel information and reservation blank on advertising p. 49.

NEWS FROM WASHINGTON

First Lieutenancy Bills Referred to Department of Defense

Bills to amend the Officer Personnel Act so that veterinarians can be commissioned as first lieutenants immediately after graduation (*see* the March, 1953, JOURNAL, p. 242) have been referred to the Department of Defense by the Armed Services Committees. The House bills are H.R. 2724 and H.R. 3160. The first was introduced by Rep. Paul Cunningham (R., Iowa), the second by Rep. Paul J. Kilday (D., Texas). The Senate bill is S.932, and was again introduced by Senator Lester C. Hunt (D., Wyo.) for Senator Robert C. Hendrickson (R., N. J.) and himself. The bipartisan sponsorship of this legislation indicates that members of Congress from both parties favor it.

The Department of Defense did not approve this legislation when it was referred to them by the last Congress. Although the Department's recommendations were not submitted to the Senate Armed Services Committee until four months after Congress had adjourned, they did not favor the Senate bill (S.2738) which was introduced by Senator Hunt last year.

It is very difficult to have legislation enacted which does not receive the endorsement of the executive department concerned. Therefore, it is highly important that the Department of Defense recommend in favor of this amendment to the Officer Personnel Act. The new Assistant Secretary of Defense, in charge of personnel and manpower, Dr. John E. Hannah, president of Michigan State College, who is on leave from the college for the defense assignment, has been asked to review the Department's policy relative to this legislation. It is hoped that Dr. Hannah will see the justification and need for commissioning veterinarians as first lieutenants.

Future developments in regard to these bills and the $100 a month bonus pay for medical officers (*see* March, 1953, JOURNAL, p. 242) will be followed closely and reported promptly in these columns.

Board of Governors Meets Secretary Benson and Confers with Government Officials

The Association's Board of Governors, President W. L. Boyd, President-Elect J. A. McCallam, and Executive Board Chairman Edwin Laitinen, concluded two days of conferences with heads of federal agencies in Washington during the latter part of February by a visit to the office of the Secretary of Agriculture, on Feb. 27, 1953. They conferred with the under-secretary, Mr. True D. Morse, and also met Secretary Ezra Taft Benson. Executive Secretary Hardenbergh accompanied the members of the Board.

Federal agency and division heads, whose programs are of vital concern to veterinarians, conferred with during the previous two days were: Dr. B. T. Shaw, administrator, Agricultural Research Administration; Dr. M. R. Clarkson, deputy administrator, A.R.A.; Dr. B. T. Simms, chief, BAI; Dr. A. R. Miller, assistant chief, and veterinarian-in-charge, Meat Inspection Division, BAI; Dr. A. K. Kuttler, veterinarian-in-charge, Brucellosis and Tuberculosis Eradication Division, BAI; Dr. C. L. Gooding, veterinarian-in-charge, Inspection and Quarantine Division, BAI; Dr. T. W. Cole, veterinarian-in-charge, Interstate Inspection Division, BAI; Dr. H. W. Schoening, veterinarian-in-charge, Pathological Division, BAI; Dr. O. E. Herl, veterinarian-in-charge, Division of Virus-Serum Control, BAI; Dr. M. S. Shahan, director, Plum Island Research Laboratory, BAI; Dr. F. Mulhern, veterinarian-in-charge, Vesicular Exanthema Eradication Program, BAI.

Conferences were also held with Dr. B. C. Pier, chief, Poultry Inspection Section, Production and Marketing Administration; Dr. Frank A. Todd, Federal Civil Defense Administration; Dr. W. T. S. Thorp, National Institutes of Health; Dr. H. E. Moskey and Dr. John H. Collins, Food and Drug Administration; Col. J. L. Hartman and Col. Wayne O. Kester, chiefs of the Veterinary Corps, Army and Air Force, respectively; Dr. J. H. Steele, Communicable Disease Center, U. S. Public Health Service; and Dr. R. J. Helvig, Milk and Food Branch, U. S. Public Health Service.

The heads of these government activities reviewed with the Board the personnel problems and the programs and activities of the service for which each is responsible.

The Board of Governors also held a business session on February 28. Attending the meeting, in addition to the Board members mentioned and Dr. Hardenbergh, were Treasurer H. E. Kingman, Jr., Editor-in-Chief W. A. Aitken, and Assistant Executive Secretary C. D. Van Houweling.

Washington Office Established

President-Elect James A. McCallam has located suitable office space in Washington, D.C., for the Association's office in the Capitol. It is room 109 in the building at 1507 M St., N.W., and was occupied beginning March 15, 1953. A telephone-answering service has also been engaged so that calls received during the day when General McCallam may be out will be relayed to him on his return.

General McCallam will coördinate his work as the Association's Washington representative with that of Assistant Executive Secretary Van Houweling and of Mr. F. M. Judge who has served the Association as its Washington reporter for the past year.

AVMA Research Fund Continues to Grow

Since the 1952-1953 AVMA Research Fund-Raising Campaign began, 1,206 veterinarians have made individual contributions totaling $16,309.39, an average of $13.52 per contribution. Veterinary associations, women's auxiliaries, and commercial companies added $8,104.00 to the fund, making a total of $24,413.39 as of Feb. 25, 1953—an increase of 25 per cent over the amount contributed up to Dec. 22, 1952 (*see* JOURNAL, Feb., 1953: 140-141).

Third Report on 1952-1953 AVMA Research Fund Campaign (Prepared Feb. 25, 1953)

State	Total Veterinarians	Quota*	Contributions received (to date)	Total amount contributed (to date)
Alabama	226	$2,260.00	19	$260.00
Arizona	71	710.00	6	70.00
Arkansas	69	690.00	5	55.00
California	1,332	13,332.00	65	865.00
Colorado	210	2,100.00	12	211.00
Connecticut	138	1,380.00	20	415.00
Delaware	42	420.00	5	75.00
District of Columbia	73	730.00	32	320.00
Florida	300	3,000.00	20	425.00
Georgia	280	2,800.00	11	147.00
Idaho	88	880.00	7	55.00
Illinois	800	8,000.00	87	1,448.50
Indiana	580	5,800.00	34	453.00
Iowa	814	8,140.00	52	640.00
Kansas	375	3,750.00	24	255.00
Kentucky	245	2,450.00	15	272.50
Louisiana	145	1,450.00	3	30.00
Maine	73	730.00	7	62.00
Maryland	149	1,149.00	20	325.00
Massachusetts	300	3,000.00	15	230.00
Michigan	623	6,230.00	53	633.06
Minnesota	525	5,250.00	43	507.00
Mississippi	128	1,280.00	5	35.00
Missouri	460	4,460.00	35	380.00
Montana	93	930.00	6	65.00
Nebraska	330	3,300.00	17	220.00
Nevada	30	300.00	1	10.00
New Hampshire	55	550.00	2	20.00
New Jersey	346	3,460.00	46	613.50
New Mexico	46	460.00	7	70.00
New York	1,161	11,161.00	82	1,550.00
North Carolina	207	2,070.00	20	325.00
North Dakota	70	700.00	3	30.00
Ohio	940	9,400.00	66	706.00
Oklahoma	220	2,220.00	13	197.50
Oregon	198	1,980.00	12	165.00
Pennsylvania	640	6,400.00	65	794.00
Rhode Island	28	280.00	1	25.00
South Carolina	110	1,100.00	3	20.00
South Dakota	119	1,190.00	7	101.00
Tennessee	168	1,680.00	5	267.50
Texas	875	8,750.00	93	707.45
Utah	68	680.00	6	140.00
Vermont	74	740.00	4	42.50
Virginia	180	1,180.00	21	284.50
Washington	314	3,140.00	26	407.00
West Virginia	78	780.00	4	50.00
Wisconsin	664	6,640.00	55	753.00
Wyoming	55	550.00	6	70.00
Hawaii	21	210.00	6	95.00
Canada	....	.....	33	396.88
Canal Zone	....	.....	1	5.00
Foreign	....	.....	1	10.00
Totals	15,136	$151,360.00	1,206	$16,309.39
Other Contributions:				
Veterinary Associations			$3,575.00	
Women's Auxiliaries			614.00	
Commercial Companies			3,915.00	8,104.00
Total contributions from all sources				$24,413.39

*Based on an average contribution of $10 per veterinarian.

The following organizations have contributed a combined total of $8,104.00:

Veterinary Associations

Central California V.M.A.
Central Minnesota V.A.
Eastern Iowa V.M.A.
Georgia V.M.A.
Indiana V.M.A.
Interstate V.M.A.
Iowa V.M.A.
Maryland State V.M.A.
Midwest Small Animal Association
Minnesota V.M.S.
National Association of Federal Veterinarians
Northern Illinois V.M.A.
Northwestern Indiana V.M.A.
Orange County (California) V.M.A.
South Georgia V.M.A.
Southeastern Michigan V.M.A.
Southern V.M.A.
Vermont V.M.A.
Women's Veterinary Medical Association
Wyoming V.M.A.

Women's Auxiliaries to the

Arkansas V.M.A.
California State V.M.A.
Central California V.M.A.
Central Illinois V.M.A.
Florida State V.M.A.
Illinois State V.M.A.
Iowa V.M.A.
Iowa State College Student Chapter
Louisiana V.M.A.
Maine V.M.A.
Maryland V.M.A.
Regional Auxiliary to the Michiana V.M.A.
Mississippi Valley V.M.A.
New York State V.M.S.
Northern Illinois V.M.A.
Ontario V.M.A.
Pennsylvania State V.M.A.
Southeastern Michigan V.M.A.
Texas State V.M.A.
Utah V.M.A.
West Virginia V.M.A.
Wisconsin V.M.A.

Commercial Companies and Related Groups

Allied Laboratories, Inc.
American Veterinary Exhibitors Association
Curts-Folse Laboratories
Grain Belt Supply Co.
Haver-Glover Laboratories
Jensen-Salsbery Laboratories
Martin Laboratories
Texas Phenothiazine Co.

General McCallam Retires as Head of Veterinary Corps

Brigadier General James A. McCallam, V.C., chief, Veterinary Division, Office of the Army Surgeon General and president-elect of the AVMA, was the guest of honor on Jan. 30, 1953, when ranking officers of the Office of the Surgeon General, members of the Veterinary Division, and friends gathered to present to him their best wishes on his retirement the following day from his post as chief of the Division and head of the Veterinary Corps of the U. S. Army.

With his retirement, General McCallam

brought to a close a period of service that spanned approximately the entire time the Veterinary Corps has been in existence. From July, 1917, about a year after the Veterinary

Brigadier General James A. McCallam

Corps was established, General McCallam has seen it grow from a small body charged with providing veterinary service for Army animals into an organization which has a major responsibility for safeguarding the health of Army troops from food-borne sickness and disease.

During his Army career, General McCallam held numerous posts as veterinary officer. He was awarded the Legion of Merit and Bronze Star medals for his service with the Sixth Army in the Southwest Pacific and wears the Commendation Ribbon. He was promoted to the rank of a Brigadier General on Jan. 24, 1948.

Veterinarians Participate in First Inter-American Congress of Public Health

The First Inter-American Congress of Public Health was held in Havana, Cuba, Sept. 26-Oct. 1, 1952; it was jointly organized by the government of the Republic of Cuba and the Pan American Sanitary Bureau. It commemorated the fiftieth anniversary of P.A.S.B. and paid homage to Carlos J. Finlay.

At the plenary sessions of the Congress, the subjects of rural sanitation, organization and integration of public health services, and recent developments in disease treatment and control were discussed by well-known authorities. Symposiums were also held on yellow fever, public health education, zoönoses, tuberculosis, and maternal and child health. Round-table discussions were held on malaria, chagas disease, schistosomiasis, and onchocerciasis.

The AVMA was officially represented at the Congress by Dr. Angel M. Morales, Havana, secretary of the Cuban Veterinary Medical Association, and by Dr. James H. Steele, U. S. Public Health Service. A number of other veterinarians from Cuba and the United States were also in attendance, some of whom are shown in the accompanying picture which was taken at a luncheon tendered by the College of Veterinary Medicine of Cuba.

The symposium on zoönoses (diseases of animals transmissible to each other and to man) included the subjects of rabies and brucellosis. Partici-

Participants in the program of the First Inter-American Congress of Public Health are (left to right)—Drs. Diego Echemendia, Cuba; Mario Valdes Figarola, Cuba; Angel M. Morales, Cuba; B. Szyfres (P.A.S.B.); Roberto Parajon, Cuba; Patrick Guilbride, Jamaica; Benj. D. Blood (P.A.S.B.); James H. Steele, United States; Mark Welsh, United States; Garcia Robiou, Cuba; John Rice, United States; Arturo Albareda, Cuba; and Radames Garriga, Cuba.

pating in these discussions were veterinary authorities from Latin American countries, the Pan American Sanitary Bureau, and the United States.

The A.A.H.A. Annual Meeting To Be Held in Minneapolis

President Myron A Thom, Pasadena, Calif., with the assistance of Program Chairman George W. Mather, School of Veterinary Medicine, University of Minnesota, St. Paul, has completed preliminary arrangements for the program of the American Animal Hospital Association's annual meeting to be held at the Hotel Radisson, Minneapolis, Minn., May 6-9, 1953.

Through the courtesy of Pitman-Moore Company, Indianapolis, Ind., and Radio Corporation of America, three half-day sessions of televised clinical demonstrations will be offered. The television studios will be set up at the veterinary school of the University of Minnesota and the program relayed to the auditorium of the Hotel Radisson.

All veterinarians interested in small animal medicine are cordially invited to participate in the meeting. Those desiring hotel reservation cards or a copy of the program may obtain them by writing to the American Animal Hospital Association, Office of the Secretary, Wayne H. Riser, 5335 Touhy Avenue, Skokie, Ill.

Dr. Riser Chosen Veterinarian of the Year

Dr. Wayne H. Riser (ISC '32), Skokie, Ill., was chosen veterinarian of the year (1952) in a nation-wide poll by the Gaines Dog Research Center, New York, for his scholarly papers presented at veterinary meetings and his energetic efforts on behalf of the profession and of dog owners. Dr. Riser is executive secretary of the American Animal Hospital Association.

Dr. Wayne H. Riser (right) receiving his Fido from Mr. Harry Miller, director of the Gaines Dog Research Center, New York.

Dr. Holm Appointed Dean of Agricultural College

Dr. Glenn C. Holm, since 1949 a member of the North Dakota Agricultural College veterinary department, has been named dean of agriculture and director of the agricultural experiment station at North Dakota Agricultural College, succeeding Dr. H. L. Walster.

Dr. Glenn C. Holm

Dr. Holm received his bachelor's degree from the University of Idaho in 1932 and the master of science degree there a year later. In 1936, he received his doctorate in veterinary medicine at Iowa State College. He served as assistant in veterinary hygiene there from 1933 to 1937, and as professor of veterinary science at the University of Idaho from 1940 to 1948.

He was state deputy veterinarian in Idaho for two years while conducting a general practice in veterinary medicine. He has served as chairman of the veterinary division of the Land-Grant College Association and was on active duty as a first lieutenant during World War II.

s/FRED LOW, *Resident Secretary*

STUDENT CHAPTER ACTIVITIES

Alabama Chapter.—The Alabama Polytechnic Institute Student Chapter of the AVMA recently held a combination square and round dance for the faculty and chapter members, their wives and dates, which besides being enjoyable served to better acquaint members of the veterinary student body. Since music was furnished by records, the only cost was for refreshments.

The Chapter currently holds two meetings a month with a speaker or motion picture featured on the program. By keeping the meeting to one hour, it does not interfere with the students' studies.

s/LUTHER T. ALBERT, *Secretary.*

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Missouri Chapter.—The regular meeting of the University of Missouri Student Chapter of the AVMA was held Feb. 9, 1953, at the clinic

Dr. D. T. Mayer, of the Agricultural Chemistry Department, spoke to the group on recent problems in reproductive physiology.

New committee members appointed by President H. H. Robertson are: program committee —Glenn Linnerson, E. W. Flint, and Walter Bone; social committee—James Hubbard, Clyde Chandler and Robert Fuchs; sports committee—Robert Davis, R. E. Pope, and Bill Buck; library and map committee—Ronald Baird, R. S. Groves, and Kyle Kent; reception committee —Walter Love, Ralph Manfull, John Bruner, Walter Landaker, Fred Madden, and Herman Baker.

s/JACK O. PARKER, *Secretary.*

WOMEN'S AUXILIARY

Women of Canada and the United States at Work Together in the AVMA Auxiliary.—The Women's Auxiliary to the American Veterinary Medical Association is truly a North American auxiliary. Membership in it is open to all women in North America who are interested in the veterinary profession.

This is a fact that is overlooked more often than one would think, but more and more women are becoming aware of the wide possibilities of an organization such as this—an organization whose wide geographical scope and membership create an opportunity to help advance the veterinary profession in a tangible way. The advantages of such an organization can be spiritual as well as material.

All of our women's auxiliaries give us an opportunity to meet each other and, through the business meetings and discussions as well as the social part of these meetings, they tend to make us more tolerant and understanding of the problems of others and, in many cases perhaps, more satisfied and more relaxed about our personal problems.

The Women's Auxiliary to the AVMA, with its widespread membership and its possibilities for greater membership, extends that opportunity, and gives us a greater vista of understanding, tolerance, and friendship with our sisters in other countries.

On the material side, there is a great power for doing good in a large organization such as our AVMA Auxiliary. Our many constructive projects — our loan fund, our help with the Research Fund — are efforts of which we are proud and which over the years have proved their worth. These funds are open to students in all the accredited colleges in North America, with no discrimination. The monthly *News Letter* which our first vice-president sends out to the student auxiliaries is shared by the student wives in both Canada and the United States. They exchange ideas and discuss problems that are common to both, with the result that they are much closer in spirit and understanding than they were before the *News Letter* came into existence.

The Ninetieth AVMA Convention, to be held in Toronto in July of this year, is the fourth meeting to be held in Canada. The last meeting was held in Montreal thirty years ago. We, in Canada, are happy to have the AVMA meet here after all these years. We are looking forward to having our friends from all over North America meet with us. Our local committees are working hard, busily and happily preparing for July 20-23, 1953. The result of this meeting is bound to bear fruit, and to make the women of Canada and of the United States more aware of the opportunity the AVMA Auxiliary gives us to work and plan together for the advancement of the veterinary profession.

s/(MRS. H. S.) HAZEL MACDONALD, *President.*

No invitation is necessary to become a member of the Women's Auxiliary to the AVMA. We welcome all interested women. The dues are only $1.00 per year. Just write to: Mrs. C. M. Rodgers, Secretary, Blandinsville, Ill.

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Illinois Auxiliary.—The eleventh annual meeting of the Women's Auxiliary to the Illinois

Officers of the Women's Auxiliary to the Ontario Veterinary Association (left to right)—Mrs. W. C. Holden, North Hall, P. Q, treasurer; Mrs. S. T. Bodendistel, Stouffville, Ont., secretary; Miss E. Kealey, Ottawa, president; Mrs. T. W. Hawke, Cobourg, first vice-president; and Mrs. Gwatkin, Ottawa. Mrs. J. C. Dancey, Cobourg, second vice-president, was not present when this picture was taken.

State Veterinary Medical Association was held Jan. 28-30, 1953, at the Hotel Sherman in Chicago. The business meeting was called to order by the president, Mrs. W. G. Raudabaugh, of Piper City, who also addressed the joint opening session of the Auxiliary and the state Association.

Among the social activities were a tea and reception in the Bal Tabarin Room of the Hotel Sherman, during which Marge Lyons of the *Chicago Tribune* gave an interesting talk on "Life in the Ozarks"; and a luncheon in the Wedgewood Room of Marshall Field and Co., at which a demonstration was given by Mrs. Gertrude Keil on "Ribbons Unlimited."

The following officers were installed on January 30 at the joint closing session: Mrs. L. J. Miller, Lincoln, president; Mrs. R. L. Poppenhouse, Sterling, president-elect; Mrs. L. H. Hill, Highland, vice-president; Mrs. Charles H. Armstrong, Chicago, secretary; Mrs. E. C. Hannan, Maple Park, membership secretary; and Mrs. W. J. Angerer, Atkinson, treasurer.

s/(MRS. T. M.) ORETA WISE, *Acting Secretary.*

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Nevada Auxiliary.—The Women's Auxiliary to the Nevada State Veterinary Association met on February 19 in Reno. An informal tea and the annual banquet highlighted the social program.

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Pennsylvania Auxiliary.—The Women's Auxiliary to the Pennsylvania State Veterinary Medical Association met at the Hotel Penn Sheraton on Jan. 6, 1953, after a luncheon in the hotel dining room. This was the first mid-winter meeting of the Auxiliary and was held in conjunction with the annual veterinary conference at the University of Pennsylvania. The meeting was conducted by Mrs. Roy Hoffman, president. Highlights of the annual convention to be held in Pittsburgh Oct. 14-16, 1953, were given.

s/MRS. GEORGE L. HARTENSTEIN, *Secretary.*

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New Jersey Auxiliary.—The Women's Auxiliary to the New Jersey Veterinary Medical Association held its annual meeting at the Essex House Hotel, Newark, on Feb. 5, 1953. Following a luncheon, the business meeting was held and the following officers were elected: Mrs. G. H. Kimnach, Hightstown, president; Mrs. R. S. Edmonds, Princeton, first vice-president; Mrs. O. K. Fox, Mt. Holly, second vice-president; Mrs. A. F. North, Somerville, secretary; and Mrs. J. B. Engle, Short Hills, treasurer.

Mrs. James Savage of Hackettstown gave a report as a delegate to the 1952 AVMA convention. Mrs. Arthur F. North, Somerville, was appointed delegate to the house of representatives for the 1953 convention.

The Auxiliary voted to send a donation of $25 to the Senior Student Loan Fund. Also, a $28 contribution was sent to the Research Fund.

Mrs. T. A. Newlin, Dover, chairman of the program, introduced Miss Grace Howell of West Orange, who gave a most interesting demonstration of glass blowing.

s/(MRS. A. F.) JANE E. NORTH, *Secretary.*

Members of the executive committee of the Women's Auxiliary to the New Jersey Veterinary Medical Association.
Front row (left to right)—Mrs. R. S. Edmonds, Mrs. G. H. Kimnach, Mrs. O. K. Fox, Mrs. J. B. Engle. Back row (left to right)—Mrs. Lester Barto, Mrs. James Savage, Mrs. Arthur F. North.

APPLICATIONS

Applicants — Members of Constituent Associations

In accordance with paragraph (b) of Section 2, Article X, of the Administrative By-Laws, as revised at the annual meeting of the House of Representatives, Aug. 18, 1951, in Milwaukee, Wis., the names of applicants residing within the jurisdictional limits of the constituent association shall be published once in the JOURNAL.

The following applicants have been certified as members of the constituent association that has jurisdiction over the area in which the applicant resides. This certification was made by the secretary of the constituent association in accordance with Section 2, Article X, of the Administrative By-Laws.

ARTHUR, ALAN J.
4261 Pearl Rd., Cleveland 9, Ohio.
D.V.M., Ontario Veterinary College, 1949.

BARR, THEODORE M.
531 E. 8 Mile Rd., Hazel Park, Mich.
D.V.M., Michigan State College, 1937.

ENGE, P. C.
Windom, Minn.
D.V.M., Texas A. & M. College, 1939.

FENNOY, DAVID H.
10824 Grantwood Ave., Cleveland 8, Ohio.
D.V.M., Tuskegee Institute, 1950.

FISKER, (MADS) CHRISTIAN F.
4416 Logan Ave., N., Minneapolis 12, Minn.
D.V.M., Royal Veterinary College, Copenhagen, 1943.

HALPIN, NEIL J. C.
1326 W. 5th. St., Santa Ana, Calif.
D.V.M., Washington State College, 1929.

KENNELLY, EDWARD M.
7 Stewart Place, White Plains, N. Y.
D.V.M., Cornell University, 1926.

RAMSAY, LAURIE D.
719 E. Jefferson Ave., LaPorte, Ind.
D.V.M., Colorado A. & M. College, 1951.

REEKER, WALLACE H.
Box 69, Minnedosa, Manitoba, Canada.
D.V.M., Ontario Veterinary College, 1942.

SCHLOSSER, RAYMOND, JR.
Chester Springs, Pa.
V.M.D., University of Pennsylvania, 1952.

WEBB, LOWELL M.
109 Haven Ave., New Lenox, Ill.
D.V.M., Kansas State College, 1943.

Applicants — Not Members of Constituent Associations

In accordance with paragraph (b) of Section 2, Article X, of the Administrative By-Laws, as revised at the annual meeting of the House of Representatives, Aug. 18, 1951, in Milwaukee, Wis., notice of all applications from applicants residing outside the jurisdictional limits of the constituent associations, and members of the Armed Forces, shall be published in the JOURNAL for two successive months. The first notice shall give the applicant's full name, school, and year of graduation, post office address, and the names of his endorsers.

First Listing

YOST, DONALD H.
Armed Forces Institute of Pathology, 7th St. & Independence Ave., S.W., Washington 25, D. C.
D.V.M., Michigan State College, 1947.
Vouchers: C. N. Barron and C. A. Gleiser.

Second Listing

DIPLOCK, PETER T., 55 Clifford Rd., Eltham, New Zealand.

VELASQUEZ, JOSE, Q., Calle 15 #8-94, Bogota, Colombia, S. A.

1952 Graduate Applicants

The following are graduates who have recently received their veterinary degree and who have applied for AVMA membership under the provision granted in the Administrative By-Laws to members in good standing of student chapters. Applications from this year's senior classes not received in time for listing this month will appear in later issues. An asterisk (*) after the name of a school indicates that all of this year's graduates have made application for membership.

Second Listing

Colorado A. & M. College*

FOLAND, HARVEY C., D.V.M., Greenbrier Animal Hospital, Lewisburg, W. Va.

U. S. GOVERNMENT

Veterinary Personnel Changes.—The following changes in the force of veterinarians in the U. S. Bureau of Animal Industry are reported as of Feb. 20, 1953.

NEW APPOINTMENTS

Paul P. Boriskie, Salt Lake City, Utah.
Carl A. Brandly, Madison, Wis.
Louis E. Buck, Cheyenne, Wyo.
Harry F. Cook, Olympia, Wash.
Merwin S. Corwin, Newark, N. J.
Benjamin F. Cox, Greenport, L. I.
Frank Delaplane, Jacksonville, Fla.
Edward A. Geue, Olympia, Wash.
Charles Gilvarg, Boston, Mass.
Carl B. Golden, New York, N. Y.
John R. Gorham, Pullman, Wash.
Leonard Jackel, Cleveland, Ohio.
Charles C. Lawrence, Olympia, Wash.
Lyle K. Miller, San Francisco, Calif.
Lawrence G. Morehouse, Indianapolis, Ind.
William J. J. Pooley, South St. Joseph, Mo.
Ronald M. Scott, Lansing, Mich.
Arthur W. Thompson, Dubuque, Iowa.
Harold A. Waters, Portland, Ore.
Grant I. Wilson, Beltsville, Md.

MILITARY FURLOUGH

Julius W. Amsiejus, Los Angeles, Calif.

CANCELLATION

Sinus Loman, Los Angeles, Calif.

RESIGNATIONS

William T. Boozer, Suffolk, Va.
Jonathan G. Harmeling, Madison, Wis.
Jonathan W. Harshman, Dayton, Ohio.
John H. Martin, Indianapolis, Ind.
Martin A. Obrecht, Omaha, Neb.
Wendell G. Peart, Sacramento, Calif.
Ralph H. Perkins, Portland, Ore.

RETIREMENTS

Ward R. Lee, Sacramento, Calif.
Birtwhistle McCormack, Kansas City, Kan.
John H. Muller, Baltimore, Md.
LaRoy Noyes, Mexico City, Mex.
Ralph H. Perkins, Portland, Ore.

TRANSFERS

Grant E. Blake, from Beltsville, Md., to Madison, Wis.
Dudley D. Conner, from Jackson, Miss., to Baton Rouge, La.
George E. Cottral, from East Lansing, Mich., to Washington, D. C., to Greenport, L. I.
Robert J. Donohue, from Portland, Ore., to Seattle, Wash.
Harry L. Gibson, from Columbus, Ohio, to Dayton, Ohio.
Orville J. Halverson, from Bismarck, N. Dak., to Cheyenne, Wyo.
Woodrow W. Harkins, from Jackson, Miss., to Phoenix, Ariz.
William A. Kittrell, from Richmond, Va., to Salt Lake City, Utah.
Fred J. Major, from San Antonio, Texas, to El Paso, Texas.
Ellis J. Martin, from Raleigh, N. Car., to Louisville, Ky.
Edwin L. Peck, from San Antonio, Texas, to Sioux City, Iowa.
George C. Sturges, from Montpelier, Vt., to Augusta, Maine.
Franklyn W. Timm, from Cleveland, Ohio, to San Francisco, Calif.
James M. Wingate, from Atlanta, Ga., to Jefferson City, Mo.

AMONG THE STATES AND PROVINCES

Alabama

Central Society.—The recently formed Central Alabama Veterinary Medical Society met at the Saugahatchee Country Club in Auburn on Feb. 11, 1953, with Dr. George Kenmore, president, presiding.

The following speakers comprised the program: **Drs. W. J. Gibbons** and **B. F. Hoerlein**, School of Veterinary Medicine, Alabama Polytechnic Institute, Auburn; **C. S. Roberts**, State Veterinary Diagnostic Laboratory, Auburn; and **H. R. Seibold**, Auburn.

Among the guests were members of the executive board of the Council on Education of the AVMA and several members from the veterinary section, U. S. Air Force Base School of Aviation Medicine, Gunter AFB, Montgomery.

s/E. M. JORDAN.

Arizona

New Association Secretary.—Dr. G. S. Calderwood, Chandler, has been appointed secretary of the Arizona Veterinary Medical Association to replace Dr. John Carney who has been called into the Armed Services.

California

State Association.—The California Veterinary Medical Association held its mid-winter conference at the University of California School of Veterinary Medicine, Davis, Jan. 26-28, 1953. Officers largely responsible for the successful meeting were Drs. A. R. Inman, Visalia, president; C. S. Travers, executive secretary; and vice-presidents P. D. DeLay, Sacramento; W. J. Zontine, Lancaster; and A. M. McCapes, Obispo.

Out-of-state speakers included: **Drs. W. A. Aitken**, Chicago; **J. A. Baker**, Ithaca, N. Y.; **V. Cabasso**, Pearl River, N. Y.; **C. D. Stein**, Washington, D. C.; and **A. Zeissig**, Rahway, N. J.

Other speakers included: **Drs. D. E. Barr**, Fresno; **P. H. Forsham** (M.D.), San Francisco; **R. V. Jessup**, Glendale; **W. S. Livingston**, North Hollywood; **J. H. Lorber**, Lafayette; **P. L. McClave**, Reseda; **W. W. Putney**, Van Nuys; **J. M. Roberts**, Oakland; and **C. H. Reid**, Hollywood. Speakers from the State Department of Agriculture at Sacramento were: **Drs. A. G. Boyd**, administrator; **P. D. DeLay** and **J. E. Stuart**; and from the School of Veterinary Medicine, University of California, Davis: **Drs. J. H. Howarth, D. E. Jasper, B. McGowan, E. A. Rhode, A. S. Rosenwald, D. W. Schalm**, and **J. D. Wheat.** Separate large animal and small animal sections were conducted on Tuesday. The Honorable Nelson R. Crow, Los Angeles, editor of the *Western Livestock Journal*, was made an honorary member of the Association and gave the banquet address on Tuesday evening.

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Southern Association.—The following officers have been appointed to serve the Southern California Veterinary Medical Association for 1953: Drs. M. H. Harvey, North Hollywood, president; P. C. Olson, Los Angeles, first vice-president; J. B. Crundwell, Burbank, second vice-president; R. H. Hurt, Los Angeles, secretary; F. P. Wilcox, Los Angeles, treasurer; D. H. McDole, Los Angeles, past-president.

s/R. H. HURT, *Secretary.*

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Dr. Traum Named Scientist for Plum Island.—Dr. Jacob Traum of the University of California has been named chief scientist for the Plum Island Animal Disease Research Institute, on Plum Island off the tip of Long Island, N. Y. He will be responsible for virological and bacteriological studies with Dr. M. S. Shahan, director of the institute.

Dr. Traum has made significant contributions in both fields. He was the first to discover the organism which causes brucellosis in swine, and the virus which causes vesicular exanthema. He has carried out research studies on foot-and-mouth disease in a number of European countries and in Mexico and took an active part in several eradication campaigns in the United States.

Work of the laboratory will be directed toward finding better methods for eradicating foot-and-mouth disease and studying other diseases that are considered serious threats to the livestock industry.

Canada

Rabies in Canada.—The veterinary director general in Canada, on Dec. 20, 1952, declared that due to a serious outbreak of rabies all dogs including sled dogs in Alberta, Saskatchewan, and Manitoba north of the fifty-fifth parallel shall be securely tied, confined, or under control. The order applies to vaccinated as well as unvaccinated dogs.

Colorado

Personal.—Captain Edward E. Dean (COL '49), Denver, is stationed in Kyoto, Japan, where he expects to make his home for the next three years. He will be joined by his wife as soon as housing is available.

District of Columbia

Quarterly Meeting.—Members of the District of Columbia Veterinary Medical Association held their first quarterly meeting at the Army Medical Graduate School, Walter Reed Hospital, on Jan. 13, 1953. The following officers

were installed for the ensuing year: Drs. E. Barnwell Smith, president; A. K. Kuttler, first vice-president; Col. Russell McNellis, second vice-president; and Dr. William C. Patterson, secretary-treasurer.

Dr. Francis J. Mulhern, in charge of the vesicular exanthema eradication program, Bureau of Animal Industry, spoke on this subject.

s/WILLIAM C. PATTERSON, *Secretary.*

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Retirement of General McCallam Recognized by Press and Radio.—The retirement of Brigadier General J. A. McCallam as chief of the Veterinary Division, Office of the Army Surgeon General, was recognized by radio and press by his appearances on WTOP on the Mark Evans Show on Friday, January 30, and a story in the *Washington Star* for Sunday, Feb. 1, 1953.

Indiana

State Association.—The sixty-ninth annual convention of the Indiana Veterinary Medical Association was held Jan. 14-16, 1953, at the Severin Hotel in Indianapolis.

Papers by the following speakers were presented on the scientific program: **Drs. Frank Booth,** Elkhart; **W. L. Boyd,** St. Paul, Minn., president of the AVMA; **Ross Brown,** Department of Animal Pathology, University of Kentucky, Lexington; **Forrest E. Brutsman,** Traer, Iowa; **Jacques Jenny,** School of Veterinary Medicine, University of Pennsylvania, Philadelphia; **C. D. Lee,** extension veterinarian, Iowa State College, Ames; **A. G. Misener,** Chicago; **Deets Pickett,** Kansas City, Mo.; **M. J. Twiehaus,** School of Veterinary Medicine, Kansas State College, Manhattan; and **E. A. Woelffer,** Oconomowoc, Wis.

s/J. L. KIXMILLER, *Resident Secretary.*

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Michiana Association.—The February 12 program of the Michiana Veterinary Medical Association featured talks and pictures on blood banks for small animals, pictures on mange of dogs, and surgery in swine. The following officers were elected: Drs. Alan Winter, Benton Harbor, Mich., president; Harry Magrane, Mishawaka, Ind., president-elect; D. D. Ramsey, LaPorte, Ind., vice-president; and Bruce Hostrawser, South Bend, Ind., secretary-treasurer.

s/J. L. KIXMILLER, *Resident Secretary.*

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Northeastern Association.—A round-table discussion of small animal problems was the feature of the February 10 meeting of the Northeastern Indiana Veterinary Medical Association. The following officers will serve during 1953: Drs. Clark Waterfall, Columbia City, president; C .W. Gunn, Fort Wayne, vice-president; and H. J. Walko, Bluffton, secretary-treasurer.

s/J. L. KIXMILLER, *Resident Secretary.*

Iowa

State Association.—At the sixty-fifth annual meeting of the Iowa Veterinary Medical Association in Des Moines, Jan. 20-22, 1953, the following speakers presented papers: **Drs. R. H. Ahrens,** Jewell; **H. E. Biester,** Veterinary Research, Iowa State College, Ames; **W. O. Brinker,** School of Veterinary Medicine, Michigan State College, East Lansing; **C. W. Cromley,** Ashville; **G. T. Edds,** Fort Dodge Laboratories, Fort Dodge; **George Gitz, Jr.,** Corning; **Clinton Gray,** Norden Laboratories, Lincoln, Neb.; **B. B. Hancock,** Fort Dodge Laboratories, Fort Dodge; **J. G. Hardenbergh,** Chicago, executive secretary, AVMA; **John B. Herrick,** extension veterinarian, Iowa State College, Ames; **M. C. Larson,** Keystone; **F. J. Mulhern,** U. S. Bureau of Animal Industry, Washington, D. C.; **A. J. Murphy,** Winthrop; **Lester Proctor,** Oelwein; **A. R. Raun,** Ottumwa; **Raymond C. Snyder,** Upper Darby, Pa.; and **G. K. L. Underbjerg,** head, Department of Physiology, Kansas State College, Manhattan.

s/F. B. YOUNG, *Secretary.*

Kentucky

Horse Research Organization Established.—The Crown Crest Farm at Lexington, Ky., recently announced the establishment of a horse research organization. In addition to nutrition and blood analysis research, x-ray equipment and a surgical room are being added for veterinarians who wish to do experimental surgery. Practitioners in human surgery will assist in developing new techniques for use in equine surgery.

Dr. E. W. Thomas of Lexington is director of the project. Other Lexington veterinarians who will cooperate are: Drs. R. E. Bardwell, A. H. Davidson, H. N. Davis, W. R. Fockele, C. E. Hagyard, W. R. McGee, D. L. Proctor, and H. S. White. Drs. W. E. Caslick and F. C. Sager of Paris, Ky., also will participate.

A veterinarian and a technician to be in full-time attendance will be employed.—*The Blood Horse, Jan. 3, 1953.*

Louisiana

State Association.—The twenty-second annual conference for the Louisiana Veterinary Medical Association, sponsored by the Department of Veterinary Science, Louisiana State University, was held Feb. 3-4, 1953. All sessions were held in Pleasant Hall on the Louisiana State University campus. The speakers on the program included: **Drs. J. G. Lee, Jr.,** dean of the College of Agriculture; **Wayne Riser,** Skokie, Ill.; **Joe Knappenberger,** Ashe-Lockhart Co., Kansas City, Mo.; **W. L. Boyd,** St. Paul, Minn., president of the AVMA; **James H. Steele,** chief, Veterinary Public Health, U. S. Department of Public Health, Atlanta, Ga.; **James G. Miller,** of the University staff; **A. V. Young,** Grand

Cane; and **F. B. Wheeler,** state veterinarian.

The following motion pictures were shown: "Protecting Poultry Products," Merck and Company; "The Antibiotics and Terramycin," Charles Pfizer and Company; "Veterinary Public Relations," Associated Serum Producers; "Vesicular Exanthema," Norden Laboratories. Vesicular exanthema was discussed by **Drs. A. G. Pass,** of the U. S. Bureau of Animal Industry in Louisiana, and **Dr. E. C. Jones,** vice-president of Norden Laboratories.

A banquet and dance were held the evening of February 3.

The newly elected officers are: Drs. J. L. Melancon, Bunkie, president; L. H. Pfrimmer, Franklinton, vice-president; R. B. Lank, Baton Rouge, secretary-treasurer.

s/W. T. OGLESBY.

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Dr. Goodwin Retires from State Board.—On Feb. 3, 1953, Dr. J. Arthur Goodwin (KCV '06), of New Iberia, retired from the State Board of Veterinary Medical Examiners after serving as its president, secretary, or treasurer for a total of thirty-seven years. He went on the Board as president in 1908 and, with the exception of two terms of four years each, served as either treasurer or secretary until the date given above. Some other veterinarian may have bettered that record and, if so, Dr. Goodwin will be pleased to learn of it so that he may congratulate the man if he is still living.

He was born in Baton Rouge in 1877, received his veterinary degree in 1906, joined the AVMA the same year, and has always been an active worker in, and supporter of, his professional associations.

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State Board of Veterinary Examiners.—The new members of the Louisiana State Board of Veterinary Medical Examiners met in Baton Rouge and elected the following officers: Drs. W. S. Hornsby, Lafayette, president; J. L. Melancon, Bunkie, vice-president; R. D. Franks, Shreveport, treasurer; and H. A. Burton, Alexandria, secretary. This board serves for four years.

s/H. A. BURTON, *Secretary.*

Michigan

Southeastern Association.—Dr. Mark L. Morris of Topeka, Kan., addressed the February 11 meeting of the Southeastern Michigan Veterinary Medical Association, in the Northern Y.M.C.A., Highland Park, on canine nutrition.

The newly elected officers are Drs. M. Cherin, Detroit, president; S. Kelly, Detroit, vice-president; G. Meyer, Detroit, secretary; C. Hodder, Detroit, treasurer; D. Boden, Dearborn, and D. Francisco, Royal Oak, directors.

s/GILBERT MEYER, *Secretary.*

Missouri

State Association.—The sixty-third annual convention of the Missouri Veterinary Medical Association was held Feb. 23-24, 1953, at the Hotel Jefferson in St. Louis.

An outstanding program on interesting and practical subjects in both the large and small animal field was presented by the following veterinarians: **Drs. R. L. Marsh,** Princeton, Ill.; **W. R. Sheets,** Farmington, Mo.; **A. G. Madden, Jr.,** Madeira, Ohio; **J. E. Weinman,** School of Veterinary Medicine, University of Missouri, Columbia; **W. G. Raudabaugh,** Piper City, Ill.; **J. D. Ray,** White Hall, Ill.; **E. A. Woelffer,** Oconomowoc, Wis.; **Paul Jungerman,** Aurora, Mo.; **A. H. Groth,** dean, School of Veterinary Medicine, University of Missouri; **A. H. Quin,** Kansas City, Mo.; **C. E. Hofmann,** Tulsa, Okla.; **W. G. Magrane,** Mishawaka, Ind.; **Jacques Jenny,** School of Veterinary Medicine, University of Pennsylvania, Philadelphia; and **M. L. Morris,** Topeka, Kan.

s/J. L. WELLS, *Secretary.*

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Kansas City Association.—The Kansas City Veterinary Medical Association met in the Hotel Continental on February 17. The guest speaker was **Dr. C. W. Turner,** University of Missouri, who discussed endocrinology for large and small animals.

s/K. M. CURTS, *Secretary.*

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Central Association.—On February 6, the Central Missouri Veterinary Medical Association met in Sedalia. **Dr. R. E. Omohundro,** veterinarian in charge, U. S. Bureau of Animal Industry, Jefferson City, discussed vesicular diseases and showed a motion picture on vesicular exanthema. **Dr. H. E. Curry,** state veterinarian, Jefferson City, discussed the seriousness of this disease in Missouri.

The Central Missouri Veterinary Medical Association has established a Student Loan Fund through which short term loans will be made to upper class students in the School of Veterinary Medicine at the University of Missouri. The fund will be administered by the faculty Committee on Student Loans at the School.

Officers of this Association are Drs. J. W. Gamby, Slater, president; B. L. Bivin, Concordia, vice-president; H. P. Callaway, Waverly, secretary-treasurer. Maurice Miller, Carrollton, delegate to the executive board; and W. J. Hayden, Marshall, alternate. The next meeting of this Association will be held May 2, 1953, at Bagnell Dam on the Lake of the Ozarks.

s/A. H. GROTH, *Resident Secretary.*

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Northwest Association.—Dr. E. F. Ebert, director of clinics, School of Veterinary Medicine, University of Missouri, Columbia, discussed cattle practice at the January 30 meeting of the Northwest Missouri Veterinary Medical Association. Forty-seven veterinarians and their wives were present at this meeting.

s/A. H. GROTH, *Resident Secretary.*

Northeast Association.—The Northeast Missouri Veterinary Medical Association met in Macon on January 22. The speaker was **Mr. L. E. Harris,** director of the Research Department of Norden Laboratories, Lincoln, Neb. Twenty-seven veterinarians were present at this meeting. This Association will hold its next meeting in Palmyra in July.

s/A. H. GROTH, *Resident Secretary.*

Nevada

State Association.—The annual meeting of the Nevada State Veterinary Association was held February 19 in Reno.

Dr. Blaine McGowan, University of California, Davis, discussed new infectious disease problems; and **Dr. M. Tran Clegg,** University of Nevada, presented a paper on the use of hormones in livestock production.

The following officers were elected at the business session: Drs. Paul S. Silva, Reno, president; Jack R. Pitcher, Minden, vice-president; and Edward Records, Reno, secretary-treasurer.

s/EDWARD RECORDS, *Secretary.*

New Jersey

State Association.—The Veterinary Medical Association of New Jersey held its sixty-ninth annual meeting on Feb. 5-6, 1953, at the Hotel Essex House in Newark.

The following speakers presented papers during the scientific sessions: **Drs. Frank Bloom,** Long Island University Medical School, New York State Medical College; **Wade O. Brinker,** School of Veterinary Medicine, Michigan State College, East Lansing; **Raymond D. Coneley,** Lima, Pa.; **A. Henry Craige, Jr.,** Pitman-Moore Co., Indianapolis, Ind.; **Joseph DeVita,** Yale University Medical School; **John S. Gray,** Newton; **R. A. Hendershott,** director, New Jersey Division of Animal Industry, Trenton; **George H. Hopson,** DeLaval Separator Co., Poughkeepsie, N. Y.; **Harlan E. Jensen,** University Heights, Ohio; **Harold C. King,** U. S. Bureau of Animal Industry, Trenton; **James H. Leathem** (Ph.D.), Rutgers University, New Brunswick; **John R. McCoy,** Rutgers University; **Arthur F. North, Jr.,** Somerville; **Charles W. Raker,** School of Veterinary Medicine, University of Pennsylvania, Kennett Square, Pa.; **Robert R. Shomer,** Teaneck; **Richard E. Shope,** Rockefeller Institute for Medical Research, New York City; **Hadley C. Stephenson,** New York State Veterinary College, Ithaca; **Amos W. Stults,** Hopewell; and **Asa Winter,** U. S. BAI, Washington, D.C.

s/J. R. PORTEUS, *President.*

New York

New York City Association.—The regular meeting of the Veterinary Medical Association of New York City, Inc., was held at the New York Academy of Sciences the evening of February 4. The meeting was called to order with President Grossman presiding. A motion picture "Varidase" was presented through the courtesy of Lederle Laboratories.

Dr. Laurent Michaud, manager of veterinary and animal husbandry, Department of Medical Division, Merck and Co., Rahway, N. J., presented a paper on "Cortone in Veterinary Medicine."

The following guests were introduced: Drs. J. O. Reed, S. Bender, J. W. Lemmon, M. P. Lawrence, J. M. Fell, C. A. Kehr, F. Hakioglu, and H. C. Stephenson.

s/C. R. SCHROEDER, *Secretary.*

North Carolina

Conference for Veterinarians.—The fifteenth annual conference for veterinarians sponsored by the North Carolina State College, Raleigh, was held Jan. 27-30, 1953, at the College in cooperation with the North Carolina State Veterinary Medical Association.

The guest speakers were **Drs. Donald E. Cooperrider,** School of Veterinary Medicine, University of Georgia, Athens; **John R. Dick,** Fort Dodge Laboratories, Fort Dodge, Iowa; **William S. Gochenour,** Pitman Moore Co., Indianapolis, Ind.; **Stpehen J. Roberts,** New York State Veterinary College, Ithaca; **E. K. Sales,** School of Veterinary Medicine, Michigan State College, East Lansing; and **Asa Winter,** chairman, Bureau of Planning and Coordinating, Committee for Emergency Activities, Washington, D. C.

The following speakers are staff members of the North Carolina State College: **Drs. Roy Elliott Barrick, Deane W. Colvard, Benjamin Franklin Cox, George Hyatt, Jr., Jack Kelley, Gennard Matrone, A. L. Shealey,** and **Hamilton A. Stewart.**

s/C. W. YOUNG, *Secretary, North Carolina V.M.A.*

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Central Carolina.—The Central Carolina Veterinary Medical Association met February 11 at the O'Henry Hotel in Greensboro, N. Car. **Dr. M. G. Lorber** of Winston Salem, N. Car., had charge of the program and led a discussion on ethics.

s/CLYDE W. YOUNG, *Resident Secretary.*

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Piedmont Association.—Officers of the Piedmont Veterinary Medical Association, elected at the November meeting, are Drs. J. I. Cornwell, Ashville, president; C. N. Copeland, Hickory, vice-president; and G. V. McCranie, Hickory, secretary-treasurer.

s/G. V. MCCRANIE, *Secretary.*

Ohio

State Association.—In spite of the unfavorable weather (sleet, ice, fog), the sixty-ninth annual

convention of the Ohio State Veterinary Medical Association, held Jan. 7-9, 1953, in Columbus, can be counted a definite success — 462 men and 175 women registered at the meeting.

The literary program, presenting a number of out-of-state practitioners, proved to be an out-

Officers of the Ohio Association

Front row (left to right)—Drs. W. O. Keefer, president; H. B. Roberts, vice-president; and J. H. Helwig, treasurer.

Back row—Drs. C. W. Cromley, president-elect; and F. J. Kingma, secretary.

standing success. The program committee is to be congratulated for its planning. The speakers were: **Drs. S. F. Scheidy,** University of Pennsylvania, Philadelphia; **William G. Magrane,** Mishawaka, Ind.; **Richard D. Turk,** A. & M. College of Texas, College Station; **L. E. Green,** Akron; **Charles W. Montgomery,** Cincinnati; **Roger W. Grundish,** Willoughby; **M. A. Custer,** Toledo; **J. L. O'Neill,** Tiffin; **Grant O. Graves** (M.D.), Columbus Academy of Medicine Mediation Board, Columbus; **R. W. Carter,** U. S. Bureau of Animal Industry, Columbus; **W. R. Krill,** dean, College of Veterinary Medicine, University of Ohio, Columbus; **J. R. Hay,** chief, Ohio Division of Animal Industry, Columbus; **H. G. Geyer,** Jensen-Salsbery Laboratories, Columbus; **C. W. Van Schoik,** chief, Division of Food and Dairies, Ohio Department of Agriculture, Columbus; **R. C. Snyder,** University of Pennsylvania, Philadelphia; **Isaac E. Hayes,** Waterloo, Iowa; **R. Leland West,** Waseca, Minn.; **R. L. Knudson,** veterinarian in charge, U. S. Bureau of Animal Industry, Columbus; **F. H. Fox,** Cornell University, Ithaca, N. Y.; **C. L. Nelson,** Jewell, Iowa; **V. L. Tharp,** Ohio State University, Columbus; **C. W. Fogle,** Leipsic; **P. T. Engard,** Marysville; **J. L. Boydston,** Wauseon; **M. E. Epperson,** Galion; **W. L. Lukens,** Hillsboro; and **R. F. Baker,** Spencerville.

Two interesting features of this meeting were the presentation of brief reports of recent developments of interest to all veterinarians; and a panel discussion of problems encountered in large animal practice, presented by guest and member speakers, with all those in attendance participating.

During the business meeting, 62 new members were admitted to the Association. It was decided to employ some type of full-time help to carry on secretarial duties. The following officers were elected: Drs. W. O. Keefer, Springfield, president; C. W. Cromley, Ashville, president-elect; H. B. Roberts, Cleveland, vice-president; J. H. Helwig, Columbus, treasurer; and F. J. Kingma, Columbus, secretary.

s/F. J. KINGMA, *Secretary.*

Ontario

Death of Dr. V. R. Brown.—Dr. Victor Robert Brown, head of the Department of Anatomy at the Ontario Veterinary College, Guelph, died at the General Hospital in Toronto on Feb. 14, 1953, after a short illness. He was only 48 years of age.

Dr. Brown was born in Harley, Ont. He attended the Ontario Agricultural College in Guelph for two years, then transferred to the Ontario Veterinary College, graduating in 1931. After a year at Michigan State College, he entered the Ontario government extension service, working for two and one-half years under Dr. Lionel Stevenson, then provincial zoölogist.

In the spring of 1935, Dr. Brown joined the faculty of the Ontario Veterinary College as

Dr. V. R. Brown

lecturer in anatomy. He was appointed professor and head of the Department of Anatomy in January, 1946, and held that post until the time of his death.

Dr. Brown was a member of St. George's

Anglican Church, Guelph, and of the Ontario Veterinary Association and the American Veterinary Medical Association which he joined in 1934. He was past-president of the American Society of Veterinary Anatomists, having held that office in 1952. He possessed considerable skill as a photographer and painter in oils, and adapted the techniques acquired in the pursuit of these hobbies to the teaching of anatomy.

At the time of his death, Dr. Brown was serving as chairman of the Committee on Meeting Rooms and Equipment of the Committee on Local Arrangements for the AVMA convention in Toronto this summer.

The sympathy of Dr. Brown's many friends in the veterinary profession is extended to his wife, the former Grace Elizabeth Leach, who resides in Guelph, and to his daughter, Mrs. H. J. Witteveen of St. George, Ontario.

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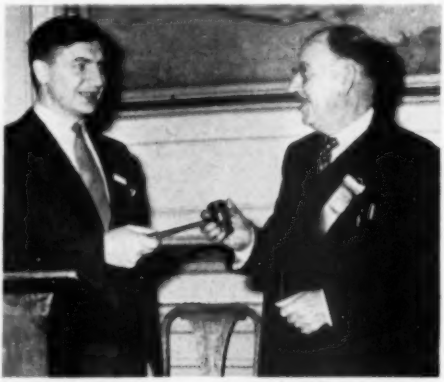
Provincial Association.—The seventy-ninth annual meeting of the Ontario Veterinary Association was held Jan. 14-16, 1953, at the Chateau Laurier Hotel in Ottawa.

Papers were presented at the scientific sessions by the following speakers: **Drs. C. D. Van Houweling,** assistant executive secretary of the AVMA, Chicago; **T. L. Jones,** principal, Ontario Veterinary College, Guelph; **L. A. Gendreau,** Sherbrooke; **D. R. Cherry,** Ottawa; **Herald R. Cox,** Lederle Laboratories, Pearl River, N. Y.; **J. R. E. Taylor,** Guelph; **Frank Todd,** Federal Civil Defense Administration, Washington, D. C.; **Chas. A. Mitchell,** Hull, P.Q.; **F. J. Milne,** Colorado A. & M. College, Fort Collins; **J. E. Johnson,** Waterloo, Ont.; **J. O. Turnbull,** Seaforth; **H. R. Potter,** Stamford Centre; **W. J. Stinson,** Perth; **J. L. Sequin,** Toronto; **Wm. F. Riley, Jr.,** School of Veterinary Medicine, Michigan State College, East Lansing; **H. M. Legard,** Toronto; **J. Archibald,** Ontario Veterinary College, Guelph; **A. L. Secord,** Toronto; **H. F. Wilder,** Buffalo, N. Y.; **J. Hutchison,** Toronto; **J. L. Davidson,** Department of Veterinary Medicine, Upjohn Co., Kalamazoo, Mich.; **Jean Rumney,** Hamilton; **C. F. Comfort,** London, Ont.; **Wm. Reid,** Fort Erie; **Adelard Groulx,** Department of Public Health, Montreal; **G. A. Edge,** Toronto; **C. A. Brandly,** Department of Veterinary Science, University of Wisconsin, Madison; **J. S. Glover,** Guelph; **W. S. Gochenour,** Pitman-Moore Co., Indianapolis, Ind.; **P. J. G. Plummer,** Hull, P.Q.; **R. A. Hendershott,** Division of Animal Industry, State of New Jersey, Trenton; **Thos. Childs,** Health of Animals Division, Ottawa.



Dr. T. Lloyd Jones, new president of Ontario Veterinary Association, receiving the gavel of office from Dr. O. Hall, past-president.

s/R. H. WRIGHT, *Resident Secretary.*

Pennsylvania

Keystone Association.—**Dr. Robert S. Brodey,** School of Veterinary Medicine, University of Pennsylvania, presented a report on mast cell sarcoma of the dog at the Jan. 28, 1953, meeting of the Keystone Veterinary Medical Association. Another feature of this program was a report on leptospirosis by **Drs. James H.**

Some of the speakers at the luncheon held during the annual meeting of the Ontario Association.
Standing (left to right)—Drs. A. L. Secord, Toronto; C. A. Brandly, Madison, Wis.; C. D. Van Houweling, Chicago; R. A. Hendershott, Trenton, N. J.; L. A. Gendreau, Sherbrooke P. Q.; F. J. Milne, Fort Collins, Colo.
Seated (left to right)—Drs. H. F. Wilder, Buffalo, N. Y.; F. Todd, Washington, D. C.; W. S. Gochenour, Indianapolis, Ind.; and H. R. Cox, Pearl River, N. Y.

Mark, Walter LaGrange, Charles W. Raker, Samuel F. Scheidy, and **M. Josephine Deubler,** who attended the National Symposium on Leptospirosis in Washington, D. C.

At the February 25 meeting, **Dr. Frank A. Todd,** Washington, D. C., discussed biological warfare.

s/RAYMOND C. SNYDER, *Secretary.*

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Bucks-Montgomery Association.—Mr. William Greenwalt, Bucks County Agricultural agent, was the guest speaker at the February 11 meeting of the Bucks-Montgomery Veterinary Medical Association.

s/VINCENT W. RUTH, *Secretary.*

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Del-High Association.—On February 12, members of the Del-High Veterinary Medical Association met in the Well House Tavern, Allentown, to hear **Dr. Walter LaGrange** of the School of Veterinary Medicine, University of Pennsylvania, Philadelphia, discuss leptospirosis.

s/F. M. IOBST, *Secretary.*

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Western Association.—The Western Pennsylvania Veterinary Medical Association met in Pittsburgh on February 11. The guest speaker was **Dr. G. S. McKee,** Washington, who discussed barnyard surgery.

s/K. L. BOLLENS, *Secretary.*

Puerto Rico

Association Meeting.—The tenth annual meeting of the Asociación Médico Veterinaria de Puerto Rico was held in the Caribe-Hilton Hotel in San Juan on Feb. 7, 1953.

An inspirational note was provided by the dedication of the annual meeting to the pioneers of the veterinary profession in Puerto Rico who eradicated glanders and infectious lymphangitis. Those honored were Drs. Adolfo A. Alvarez Valdés, Jaime Bagué, Francisco Menéndez Guillot, Angel C. Pou, Alfonso Rivera, and Juan Varas Catalá (deceased).

After the business session, the following program was presented: **Dr. David Pimentel,** "Toxicity Tests on Mongooses in Puerto Rico"; **Dr. Enrique Pérez,** "Opsonic Index in Brucellosis Diagnosis"; **Dr. Otto Stader,** Ardmore, Pa., "Reduction of Fractures with the Stader Splint"; **Dr. J. D. Rivera Anaya,** "A New Method for the Diagnosis of *Fasciola Hepatica* in Cattle"; and **Dr. John D. Almquist,** Penn State College, "Latest Research Information on Artificial Insemination."

The officers elected for this year are Drs. Enrique Toro, president (reëlected); Saez Quiñones, vice-president; José D. Rivera Anaya, secretary-treasurer (reëlected); Humberto Zayas Chardon, member; and Dorian Lugo Rubio, member.

Members of the Veterinary Corps stationed in Puerto Rico who attended as guests were Col. Velmer W. McGinnis and Capt. Ralph L. Lowery.

An informal reception for veterinarians and their wives, held by Dr. and Mrs. Cesar Clavell at their home, ended the festivities.

s/O. A. LOPEZ-PACHECO, *Resident Secretary.*

Quebec

Board of Governors.—The Board of Governors of the College of Veterinary Surgeons, Province of Quebec, for 1952-1954 is as follows: Officers—Drs. Paul Villeneuve, Montreal, president; Camiller Julien, St.-Félicien (Roberval), vice-president; L. P. E. Choquette, Macdonald College (Jacques-Cartier), secretary-treasurer; and J. D. Nadeau, St.-Hyacinthe, registrar. Governors—Drs. J. A. Brassard, St. Pierre de Charlesbourg; Edouard Breton, Warwick (Arthabaska); **Mozart Clairmont, St. Jean;** Grégoire Pagé, Cowansville; and Lucien Cournoyer, St. Hyacinthe.

s/L. CHOQUETTE, *Secretary.*

South Dakota

State Association Officers.—At the annual meeting of the South Dakota Veterinary Medical Association, Oct. 16-17, 1952, the following officers were elected: Drs. M. C. Kromminga, Centerville, president; G. E. Duncan, Tyndall, vice-president; R. M. Scott, Sioux Falls, secretary-treasurer.

s/R. M. SCOTT, *Secretary.*

Utah

Intermountain Association.—The Intermountain Veterinary Medical Association with membership in eight Rocky Mountain states had a fine meeting in Salt Lake City Jan. 19-21, 1953. With **Dr. Rue Jensen,** Ft. Collins, Colo., presiding, and **Dr. M. L. Miner,** Logan, Utah, as secretary, the information-packed program covered a lot of ground. Nonassociation speakers included: **Drs. W. A. Aitken,** Chicago; **J. A. Baker,** Ithaca, N. Y.; **V. J. Cabasso,** Pearl River, N. Y.; **R. E. Duckworth,** Sacramento, Calif.; **C. D. Stein,** Washington, D. C.; **R. A. Stocking,** Los Angeles, Calif.; and **A. Zeissig,** Rahway, N. J.

Other speakers included: **Drs. R. C. Bay,** Salt Lake City; **L. A. Griner,** Fort Collins; **H. Marsh,** Bozeman, Mont.; and **M. L. Miner.** Regulatory men, practitioners, and research workers held separate informal discussion groups Monday evening, and at a luncheon Tuesday noon a lively discussion of sheep diseases ensued. Dr. Howard F. Wilkins of Helena, Mont., will serve as president this year.

Vermont

State Association.—On Feb. 7, 1953, the Vermont Veterinary Medical Association held its annual winter meeting at the Hotel Vermont in Burlington. Two motion pictures from the AVMA film library, "Bovine Surgery" and

"Bovine Allergic Dermatitis," were shown. Dr. David H. Baldwin of Putney and Dr. John McVicar of Vergennes were accepted as members of the Association. In addition to the reports of the secretary and treasurer, six committees reported their activities for the year. Proposed changes in the Vermont brucellosis laws were discussed by **Dr. John Canty** of the Department of Agriculture. These changes consisted of compulsory calfhood vaccination and branding of reactors. **Dr. E. K. Treat**, delegate, reported on the AVMA convention at Atlantic City. The possibility of establishing uniform minimum fees for specific services was discussed and referred to a committee for further consideration. Practitioners were also polled to see if they were in favor of assuming responsibility of infectious bronchitis inoculation in Vermont poultry flocks. Opinion was divided on this question.

New officers for 1953 are Drs. Norman H. Cox, Rutland, president; Charles Hults, West Rutland, president-elect; J. F. Roberts, Woodstock, vice-president; and W. D. Bolton, Burlington, secretary-treasurer.

A banquet and entertainment completed the program.

s/W. D. BOLTON, *Secretary*.

BIRTHS

Captain (TEX '45) and Mrs. Samuel K. Kirk, Fort Richardson, Alaska, announce the birth of a son, Douglas Walter, on Dec. 7, 1952.

Dr. (COL '46) and Mrs. O. R. Adams, Fort Collins, Colo., announce the birth of a son, Robert Scott, on Dec. 11, 1952.

Mr. and Mrs. Lester Geller (Estelle Hecht Geller, COR '47), New York, N. Y., announce the birth of a son, Mark Joshua, on New Year's Eve, 1952.

Dr. (PA '47) and Mrs. Lloyd B. Kornblatt, Metuchen, N. J., announce the birth of a son, Arnold Nelson, on Jan. 25, 1953.

Dr. (MSC '47) and Mrs. John H. Wright, Austin, Minn., announce the birth of a son, Douglas Allyn, on Jan. 29, 1953.

DEATHS

★**E. W. Almquist** (WSC '32), 44, Hillsboro, Ore., died Jan. 5, 1953. Dr. Almquist, a general practitioner, was a member of the Oregon Veterinary Medical Association and of the AVMA. He is survived by his widow.

★**Victor R. Brown** (OVC '31), 48, Guelph, Ont., died Feb. 14, 1953. An obituary appears on page 341 of this JOURNAL. Dr. Brown was a member of the AVMA.

Bradbury B. Coale (KSC '34), 55, Fontana, Calif., died Jan. 18, 1953. Most of his professional career was in an official capacity with the U. S. Bureau of Animay Industry, California State Department of Agriculture, and the Los Angeles County Livestock Department. Dr. Coale had practiced recently in Fontana and had served as veterinarian for the Fontana Farms Company. He is survived by his widow and a son. Dr. Coale was a member of the California State and Southern California Veterinary Medical Associations. He had been a member of the AVMA.

★**T. Purdy Cook** (IND '11), 70, Rochester, Ind., died in January, 1953. Dr. Cook was a member of the Indiana Veterinary Medical Association and of the AVMA.

★**Russell S. Gerard** (CVC '13), 65, Sigourney, Iowa, died Jan. 3, 1953. Dr. Gerard served in the U. S. Army during World War I. He had practiced in Sigourney from 1913 until his retirement in 1950. Dr. Gerard is survived by two sons and five grandchildren. He was admitted to the AVMA in 1924.

★**Samuel J. Gibson** (OVC '07), 65, Haney, B. C., died Nov. 1, 1952. Dr. Gibson had been in ill health for some time. He was admitted to the AVMA in 1918.

★**Charles F. Gitz** (KCV '12), 62, Rogers, Ark., died recently. Dr. Gitz was a poultry inspector for the U. S. Bureau of Animal Industry. He was a member of the Arkansas Veterinary Medical Association and of the AVMA.

★**Gustave A. Kay** (CVC '02), 75, Dallas, Texas, died Feb. 10, 1953, of a heart attack. Dr. Kay served thirty-three years with the Bureau of Animal Industry in meat inspection, field service, hog cholera control, and foot-and-mouth disease eradication. He retired in 1939, but was reemployed by the BAI in 1942 and assigned to the Fort Worth, Texas, meat inspection force, with headquarters at Dallas. He was state veterinarian at the time of his death.

Dr. Kay is survived by his widow and two daughters. He was a member of the AVMA.

★**Harry E. Myers** (OVC '05), 70, Lakewood, Ohio, died Jan. 20, 1953, of a heart ailment. Dr. Myers was a member of the Ohio Veterinary Medical Association and of the AVMA. He is survived by his widow.

★**Mulford C. Thompson** (COR '05), 76, Sharon, Conn., died Dec. 28, 1952. Dr. Thompson had practiced in Sharon since 1905. He was admitted to the AVMA in 1906.

★**Benjamin T. Woodward** (UP '02), 71, Santa Ana, Calif., died Feb. 10, 1953. For twenty years, Dr. Woodward served with the U. S. Bureau of Animal Industry. He later entered private practice from which he retired in 1952. Dr. Woodward, active in association activities, was admitted to the AVMA in 1903. He is survived by his widow.

★Indicates members of the AVMA.

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COMING MEETINGS

Notices of Coming Meetings must be received by 4th of month preceding date of issue

Animal Disease Research Workers in the Southern States. Thomas Hotel, Gainesville, Fla., April 7-8, 1953. B. F. Cox, U. S. Bureau of Animal Industry, Washington, D. C., secretary.

Washington, State College of. Annual conference for veterinarians. School of Veterinary Medicine, State College of Washington, Pullman, Wash., April 9-11, 1953. R. E. Watts, School of Veterinary Medicine, Washington State College, Pullman, Wash.

Northern Illinois Veterinary Medical Association. Spring meeting. Faust Hotel, Rockford, Ill., April 15, 1953. J. W. Boller, Harvard, Ill., secretary.

Ohio State University. Annual conference for veterinarians. College of Veterinary Medicine, Ohio State University, April 15-16, 1953. John H. Helwig, chairman.

North Central Iowa Veterinary Medical Association. Annual meeting. Warden Hotel, Fort Dodge, Iowa, April 16, 1953, from 10:00 a.m. to 5:00 p.m. B. J. Gray, Fort Dodge Laboratories, Fort Dodge, Iowa, secretary.

American Animal Hospital Association. Annual meeting. Hotel Radisson, Minneapolis, Minn., May 6-9, 1953. Wayne H. Riser, 5335 Touhy Ave., Skokie, Ill., secretary.

Oklahoma conference for veterinarians. School of Veterinary Medicine, Stillwater, Okla., May 11-12, 1953. D. M. Trotter, professor and head, Department of Veterinary Pathology, chairman.

International Fertility Association. World conference. Henry Hudson Hotel, New York City, May 25-31, 1953. Abner I. Weisman, M.D., 1160 Fifth Ave., New York 29, N.Y., Chairman, Committee on Arrangements.

Texas Conference for Veterinarians. School of Veterinary Medicine, A. & M. College of Texas, June 4-5, 1953. R. D. Turk, chairman, conference committee.

Montana Veterinary Medical Association. Annual meeting. Bozeman, Mont., June 11-13, 1953. E. A. Tunnicliff, Bozeman, Mont., secretary.

Georgia Veterinary Medical Association. Annual meeting. Atlanta Biltmore Hotel, Atlanta, Ga., June 21-23, 1953. Chas. C. Rife, 420 Edgewood Ave., N. E., Atlanta, Ga., secretary.

North Carolina State Veterinary Medical Association and South Carolina State Veterinary Medical Association. Joint meeting. Mayview Manor, Blowing Rock, N. Car., June 22-23, 1953. C. W. Young, Mocksville, N. Car., secretary, North Carolina Association.

South Carolina State Veterinary Medical Association and North Carolina State Veterinary Medical Association. Joint meeting. Mayview Manor, Blowing Rock, N. Car., June 22-23, 1953. R. A. Mays, P. O. Box 1147, Columbia 1, S. Car., secretary, South Carolina Association.

California State Veterinary Medical Association. Annual June meeting. Lafayette Hotel, Long Beach, Calif., June 22-24, 1953. Charles S. Travers, 3004 16th St., Room 208, San Francisco 3, Calif., executive secretary.

Maritime Veterinary Associations. Joint conference. Mount Allison University, Sackville, N. B., June 23-25, 1953. J. F. Frank, Sackville, N. B., secretary, joint committee.

Maryland State Veterinary Medical Association. Annual summer meeting. George Washington Hotel, Ocean City, Md., June 25-26, 1953. John D. Gadd, Cockeysville, Md., secretary.

Kentucky Veterinary Medical Association. Annual summer meeting. Seelbach Hotel, Louisville, Ky., July 8-9, 1953. T. J. Stearns, Room 216, Live Stock Exchange Bldg., Louisville, Ky., secretary.

American Veterinary Medical Association. Annual meeting. Royal York Hotel, Toronto, Ont., July 20-23, 1953. J. G. Hardenbergh, 600 S. Michigan Ave., Chicago 5, Ill., executive secretary.

New York State Veterinary Medical Society. Annual meeting. Hotel Syracuse, Syracuse, N. Y., Sept. 14-16, 1953. J. S. Halat, 803 Varick St., Utica, N. Y., acting executive secretary.

Alabama Annual Conference for Veterinarians. School of Veterinary Medicine, Alabama Polytechnic Institute, Auburn, Ala., Sept. 17-19, 1953. R. S. Sugg, dean.

Pennsylvania State Veterinary Medical Association. Annual meeting. Hotel William Penn, Pittsburgh, Pa., Oct. 14-16, 1953. R. D. Snyder, Walnut St. and Copley Rd., Upper Darby, Pa., secretary.

Kansas State Veterinary Medical Association. Annual meeting. Broadview Hotel, Wichita, Kan., Jan. 18-20, 1954. K. Maynard Curts, Kansas City, Kan., secretary.

(Continued on p. 30)

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(COMING MEETINGS—*continued from p. 28*)

Regularly Scheduled Meetings

Bay Counties Veterinary Medical Association, the second Tuesday of each month. David E. Madsen, 44 South 4th St., San Jose, Calif., secretary.

Cedar Valley Veterinary Association, the second Monday of each month (except July and August) at Black's Tea Room, Waterloo. F. E. Brutsman, Traer, Iowa, secretary.

Central California Veterinary Medical Association, the fourth Tuesday of each month. W. E. Smith, 516 Oatman, Sanger, Calif., secretary.

Central Carolina Veterinary Medical Association, the second Wednesday of each month at 7:00 p.m. in the O'Henry Hotel in Greensboro. Mr. Earl D. Adams, Greensboro, N. Car., secretary.

Chicago Veterinary Medical Association, the second Tuesday of each month. Robert C. Glover, 1021 Davis St., Evanston, Ill., secretary.

Coastal Bend Veterinary Association (Texas), the second Wednesday of each month. J. E. Hoban, 4301 S. Port Ave., Corpus Christi, Texas, secretary.

Coon Valley Veterinary Association, the second Wednesday of each month, September through May, at the Bradford Hotel, Storm Lake, Iowa. J. R. Rosdail, Pomeroy, Iowa, secretary.

Cuyahoga County (Cleveland, Ohio) Veterinary Medical Association, the first Wednesday of each month—September through May (except January)—at 9:00 p.m. at the Carter Hotel, Cleveland, Ohio. Roger W. Grundish, 4217 Mayfield Road, South Euclid 21, Ohio, secretary.

East Bay Veterinary Medical Association, bimonthly, the fourth Wednesday. Robert Clemens, 23352 Orchard, Hayward, Calif., secretary.

Fayette County Veterinary Association, Iowa, the third Tuesday of each month, except in July and August, at Pa and Ma's Restaurant, West Union, Iowa. Donald E. Moore, Box 178, Decorah, Iowa, secretary.

Florida, North-East Florida Veterinary Medical Association, the second Thursday of each month, time and place specified monthly. J. O. Whiddon, 829 San Marco Blvd., Jacksonville, Fla.

Greater St. Louis Veterinary Medical Association. Ralston-Purina Research Building, St. Louis, Mo., the first Friday in February, April, June, and November. George A. Franz, 3667a Marceline Terrace, St. Louis, Mo., secretary.

Houston Veterinary Medical Association, Houston, Texas, the first Thursday of each month.

(*Continued on p. 32*)

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(COMING MEETINGS—*continued from p. 30*)

Edward Lepon, Houston, Texas, secretary-treasurer.

Illinois Valley Veterinary Medical Association, the second Sunday evening of even-numbered months at the Jefferson Hotel, Peoria, Ill. S. M. McCully, Lacon, Ill., secretary.

Indiana Tenth District Veterinary Medical Association, third Thursday of each month. L. A. Snider, New Palestine, Ind., secretary.

Jefferson County Veterinary Society of Kentucky, Inc., the first Wednesday evening of each month, in Louisville or within a radius of 50 miles. E. M. Lang, 716 E. Broadway, Louisville, Ky., secretary.

Kansas City Small Animal Hospital Association, the first Monday of each month, at the Hotel Continental. T. M. Eagle, Parkville, Route 2, Mo., secretary.

Kansas City Veterinary Medical Association, the third Tuesday of each month, in the Hotel Continental, 11th and Baltimore, Kansas City, Mo. K. M. Curts, 70 Central Ave., Kansas City 18, Kan., secretary.

Kern County Veterinary Medical Association, the first Thursday of each month. Richard A. Stiern, 17 Niles St., Bakersfield, Calif., secretary.

Keystone Veterinary Medical Association, the Philadelphia County Medical Society Building, 301 S. 21st Street, Philadelphia, Pa., on the fourth Wednesday of each month. Raymond C. Snyder, 39th and Woodland Ave., Philadelphia 4, Pa., secretary.

Kyowva Veterinary Medical Association, the second Thursday of each month in the Hotel Prichard, Huntington, W. Va., at 8:30 p.m. Karl Mayer, 1531 Fourth Ave., Huntington, W. Va., secretary.

Maricopa County Veterinary Association, the second Tuesday of each month. Charles J. Prchal, 1722 East Almeria Road, Phoenix, Ariz., secretary.

Metropolitan New Jersey Veterinary Medical Association, the third Wednesday evening of each month from September through May, at the Academy of Medicine of Northern New Jersey, 91 Lincoln Park South, Newark, N. J. Myron S. Arlein, 2172 Millburn Ave., Maplewood, N. J., secretary.

Michiana Veterinary Medical Association, the second Thursday of each month, at Hotel LaSalle, South Bend, Ind. Bruce Hostrawser, 2621 Mishawaka Ave., South Bend, Ind., secretary.

Michigan, Southeastern Veterinary Medical Society. Herman Kiefer Hospital, Detroit, Mich., the second Wednesday of each month from October through May.

(*Continued on p. 34*)

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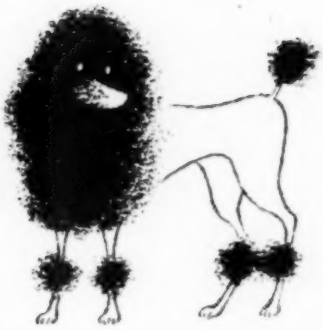

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(COMING MEETINGS—*continued from p. 32*)

Mid-Coast Veterinary Medical Association, the first Thursday of every even month. C. Edward Taylor, 2146 S. Broad St., San Luis Obispo, Calif., secretary.

Milwaukee Veterinary Medical Association. Wisconsin Humane Society, 4150 N. Humbolt Ave., Milwaukee, Wis., the third Tuesday of each month. Kenneth G. Nicholson, 2161 N. Farwell Ave., Milwaukee, Wis., secretary.

Mobile-Baldwin Veterinary Medical Association, the first Tuesday of each month at the Hotel Admiral Simmes, Mobile, Ala. C. Eric Kennedy, Mobile, Ala., secretary.

Monterey Bay Area Veterinary Medical Association, the third Wednesday of each month. C. Edward Taylor, 2146 South Broad St., San Luis Obispo, Calif., secretary.

New Castle County Veterinary Society, the second Wednesday of each month at 9:00 p.m. in the Hotel Rodney, Wilmington, Del. Harold Roberts, Paper Mill Road, Newark R3, Del., secretary.

New York City, Veterinary Medical Association of, the first Wednesday of each month at the New York Academy of Sciences, 2 East 63 St., New York City. C. R. Schroeder, Lederle Laboratories, Inc., Pearl River, N. Y., secretary.

Northern New Jersey Veterinary Association, the fourth Tuesday evening from September through June, at the Casa Mana Restaurant, Cedar Lane, Teaneck, N. J. Robert R. Shomer, 1680 Teaneck Road, N. J., secretary.

Northern San Joaquin Valley Veterinary Medical Association, the fourth Wednesday of each month. Tom Hagan, Gen. Del., Escalon, Calif., secretary.

Oklahoma County Veterinary Medical Association, the second Wednesday of every month except July and August. W. C. Schilb, 4312 N. W. 23rd St., Oklahoma City, Okla., secretary.

Orange Belt Veterinary Medical Association, the second Monday of each month at 7:00 p.m. in the Antlers Hotel, San Bernardino, Calif. R. E. Hoadley, Coachella, Calif., secretary.

Orange County Veterinary Medical Association, bi-monthly. Donald E. Lind, 2643 N. Main, Santa Ana, Calif., secretary.

Peninsula Veterinary Medical Association, the third Monday of each month. P. H. Hand, Box 1035, Millbrae, Calif., secretary.

Piedmont Veterinary Medical Association, the last Friday of each month at 7:00 p.m. in Mull's Motel in Hickory, N. Car. G. V. McCranie, Hickory, N. Car., secretary.

Pima County (Arizona) Veterinary Medical Association, the third Wednesday of each month,

(*Continued on p. 36*)

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(COMING MEETINGS—*continued from p. 34*)

in Tucson. R. W. Adami, 2103 S. 6th Ave., Tucson, Ariz., resident secretary.

Portland (Oregon) Veterinary Medical Association, the second Tuesday of each month, in the Auditorium of the Upjohn Company. Victor T. Oliver, 9705 S.W. Barbur Blvd., Portland 19, Ore., secretary.

Redwood Empire Veterinary Medical Association, the third Thursday of each month. H. M. Strandberg, 203 D St., Petaluma, Calif., secretary.

Roanoke-Tar (N. Car.) Veterinary Medical Association, the first Friday of each month, time and place specified monthly. C. B. Randall, Kinston, N. Car., secretary.

Sacramento Valley Veterinary Medical Association, the second Wednesday of each month. S. M. Foster, 430 College, Woodland, Calif., secretary.

Saginaw Valley Veterinary Medical Association, the last Wednesday of each month. H. W. Harper, Flint Health Department, Flint, Mich., secretary.

San Diego County Veterinary Medical Association, the fourth Tuesday of each month. Warren J. Dedrick, 904 S. Lemon, El Cajon, Calif., secretary.

Santa Barbara-Ventura Counties Veterinary Medical Association, Friday evenings every sixth week. Dee Wodars McDermott, 5879 Hollister, Coleta, Calif., secretary.

Southern California Veterinary Medical Association, the third Wednesday of each month. R. W. Sprowl, 11756 San Vicente Blvd., Los Angeles 49, Calif., secretary.

South Florida Veterinary Society, the third Tuesday of each month, at the Seven Seas Restaurant, Miami, Fla. E. A. Majilton, 1093 N. E. 79th St., Miami, Fla., secretary.

Tulsa Veterinary Medical Association, the third Thursday of each month, in Director's Parlor of the Brookside State Bank, Tulsa, Okla. John Carnes, Muskogee, Okla., secretary.

Foreign Meetings

Fifteenth International Veterinary Congress. Stockholm, Sweden, Aug. 9-15, 1953. Dr. L. de Blieck, Soestdijkseweg 113N., Bilthoven, Netherlands, secretary, Permanent Committee. (U. S. Committee: Dr. W. A. Hagan, N. Y. State Veterinary College, Ithaca, N. Y., chairman; Dr. J. G. Hardenbergh, 600 S. Michigan Ave., Chicago 5, Ill., secretary.)

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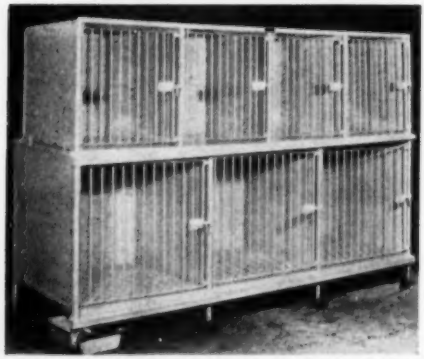

IMPROVED 7-CAGE DE LUXE DRAIN UNIT

Also available in removable tray style, or plain, flat floor style in 3, 5, 7, or 12 cage units.

Note new style Bar Doors — Door frames, top and bottom, made of 1 inch tubes: water runs off instead of remaining on door frame.

IMPROVED DOG DRYER WITH ENTIRELY TRANSPARENT DOORS

Write for NEW cage booklet; also dryer folder

The 1953 price list is now available

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CAPSULES

EVSCO

Soft Elastic Capsules Containing Unsaturated Fatty Acids for the Treatment of Scaly Canine Dermatoses and Dull Hair Coats

Formula

EACH CAPSULE CONTAINS:

168 mg. of unsaturated fatty acids, principally Linoleic and Linolenic, prepared from refined Linseed Oil.

Easy to dispense.

Capsules are 3 minim size

1000 — $7.90

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Available Thru Your Veterinary Supply Dealer Or Write Direct. Catalog Sent Upon Request.

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Twenty-five words or less, $2.50; 8 cents for each additional word. Replies sent in care of the JOURNAL, 25 cents extra.

Remittance must accompany order.

Deadline for want ads 8th of month preceding date of issue.

Names of classified advertisers using key letters can not be supplied. Address your reply to the key letters, c/o JOURNAL of the AVMA, 600 S. Michigan Ave., Chicago 5, Ill., and it will be transmitted to the advertiser.

Wanted—Veterinarians

VETERINARIAN WANTED—applications are invited for an annually rotating clinical and research internship. Employment equally divided between research and practice. Laboratory, surgical, x-ray, and library facilities available. Salary $3,000 per annum. Massachusetts license essential. Address Dr. Marcus M. Mason, 20 Harvard St., Worcester, Mass.

WANTED—veterinarian for permanent position on staff of an excellently equipped hospital serving a busy mixed practice in the Southeast. Give professional qualifications. Will answer all letters and return any photos. Address "Box F 4," c/o JOURNAL of the AVMA.

Opportunity for capable veterinarian in long-established small animal practice in Connecticut. Job can lead to partnership. Give full resume and salary expected first letter. Address "Box F 8," c/o JOURNAL of the AVMA.

WANTED—able veterinarian to take full charge of busy small animal hospital, New York State. Owner in service. Opportunity for financial gain. Comfortable apartment included. Address "Box C 8," c/o JOURNAL of the AVMA.

WANTED VETERINARIAN—to manage small animal hospital in attractive suburb. Salary or percentage given. Lucrative practice, new hospital, long-established clientele. Address "Box F 17," c/o JOURNAL of the AVMA.

WANTED VETERINARIAN—with Maryland license, to assume full charge of established small animal hospital with opportunity for right man to eventually lease. Will consider June graduate. Address "Box F 18," c/o JOURNAL of the AVMA.

(Continued on p. 40)

Send for FREE 36-page Treatise on

CARROT OIL VITAMINS

Details the advantages of carrot oil vitamins when used in foods to improve breeding results; to destroy oxidized milk flavors; and to promote general good health and glossy coats. Contains much information. Replete with data and references. Send for it today

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The only dry dog food that's officially approved!

TESTED

AMERICAN VETERINARY MEDICAL AND ANIMAL HOSPITAL ASSOCIATIONS

APPROVED

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PROTECTIVE

DOG FOOD

What makes them come back for more?

Throughout the dairy regions, more and more veterinarians are realizing that when they dispense MASTICS P & S for mastitis control and instruct farmers in the necessary sanitary procedures, it invariably means repeat business. *Why* do the farmers come back for more . . . over and over again?

Probably the first and foremost reason is that MASTICS P & S are the most economical preparation available for the treatment of mastitis. But the price alone doesn't bring in repeat orders. It takes a combination of price *plus* effectiveness to do that. And MASTICS P & S are *really* effective.

There is no better form of treatment known for the control of mastitis than the combination of penicillin and dihydrostreptomycin, such as contained in MASTICS P & S. And nothing surpasses penicillin for treating staphylococcic infections.

A new dosage form of MASTICS P & S is now available, with greatly increased potency—100,000 units of penicillin and 50,000 micrograms of dihydrostreptomycin in each individually foil-wrapped bougie.

There's been a substantial price reduction, too, making MASTICS P & S the best dose-for-dose and dollar-for-dollar buy. Boxes of 25 cost only $4.75, 100's are $18.00 and 500's are $80.00.

You can help the farmers in your community save money in treating mastitis—and you will help yourself, too. Write us for dispensing samples and find out why the farmers come back for more. The Martin Laboratories, Dept. C, P.O. Box 532, West Chester, Pa.

(CLASSIFIED ADS—*continued from p. 38*)

VETERINARIAN WANTED—for veterinary division of large packing company's research laboratory to handle livestock and poultry disease control work. Poultry interest and experience is desirable. An excellent opportunity for the right person. Must be a recent graduate of an AVMA-approved school. Send complete and detailed information in first letter. Address "Box F 20," c/o JOURNAL of the AVMA.

WANTED VETERINARIAN—predominantly small animals, for modern well-equipped hospital. All replies held confidential. Dr. R. A. Self, 800 N. Oak Cliff Blvd., Dallas, Texas.

Wanted—Positions

Experienced, graduate veterinarian available for relief work while you are on vacation. Licensed. Address "Box E 22," c/o JOURNAL of the AVMA.

WANTED—senior student to graduate in June desires position in Minnesota, following graduation, with busy practitioner with future possibilities. Address "Box E 4," c/o JOURNAL of the AVMA.

QUALIFIED VETERINARIAN—has five years broad experience in research and production with attenuated viruses, virus vaccines, desiccated vaccines. Desires interesting opportunity. Available March. Address "Box E 1," c/o JOURNAL of the AVMA.

Immigrant displaced veterinarian wants job as assistant. Age 41, 1 year in United States, speaks fair English. Ready to move. Franz Abt, 4325 S. Figueroa St., Los Angeles 37, Calif.

Married veterinarian with considerable experience in both large and small animal practice desires to work as associate with an established practitioner. Address "Box F 2," c/o JOURNAL of the AVMA.

Texas graduate, 1950, desires position as ranch veterinarian, assistantship with veterinarian planning to retire, or a location in need of a veterinarian. Southern United States preferred. Address "Box F 3," c/o JOURNAL of the AVMA.

Graduate of AVMA-approved school, six years' experience, desires position in small animal practice. Would lease with option to buy. California only; married, veteran. Address "Box F 6," c/o JOURNAL of the AVMA.

WANTED POSITION—in veterinary research. Graduate in zoölogical sciences, McGill University, Montreal, also preclinical sciences, Ontario Veterinary College. Knows French and German. Good references. U. S. citizen. Address "Box F 7," c/o JOURNAL of the AVMA.

(*Continued on p. 42*)

40 years of service to the veterinary field

GOSHEN LABORATORIES, INC.

GOSHEN, NEW YORK

THE PRACTITIONER'S HOUSE

When you buy, buy from an ethical house

use Armour anti-hog cholera serum and hog cholera virus!

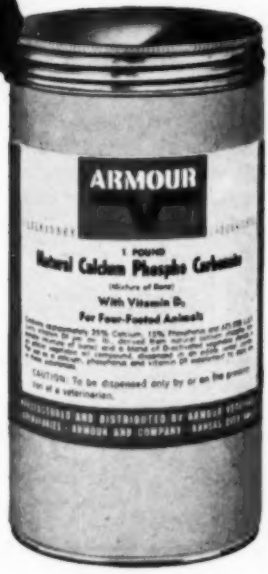
For *Dependability of product*
Dependability of supply

Sold to graduate Veterinarians only

Veterinary Laboratories
A Division of Armour and Company
KAW Station, Kansas City 18, Kansas

Natural Calcium Phospho Carbonate

with Vitamin D_2



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Natural Calcium Phospho Carbonate has been produced from organic sources in a definite particle size. This particle size makes possible a high degree of assimilation (98% in controlled experiments).

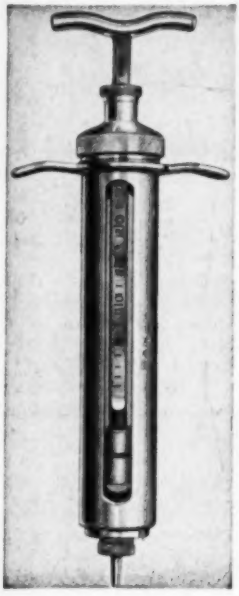
It provides calcium and phosphorus in their natural or optimum ratio along with trace minerals and 4000 U. S. P. units of Vitamin D_2 per teaspoonful.

When used as a supplement to diets low in these substances, it aids in the control of rickets, osteomalacia, poor skeletal development and poor tooth formation. It also helps maintain normal reproduction and lactation.

Available in 1-lb.—5-lb.—25-lb. packages. Dispensed only by or on the prescription of Graduate Veterinarians.

ARMOUR
VETERINARY LABORATORIES • KAW STATION • KANSAS CITY 18, KANSAS
A Division of Armour & Company

Ranch Record Veterinary Syringe



Superior quality veterinary syringes—Choice of ground glass barrel with metal plunger or rubber packing—Accurate dosage and smooth operation always assured.

Inexpensive replacement parts available.

Inquire at your nearest veterinary dealer or wholesaler concerning this outstanding product.

Sizes 2 cc. to 40 cc.

Boston Record Syringes

High quality syringe consisting of graduated, ground, resistance glass barrel with nickel silver plunger and strongly constructed metal parts. No Washers—No Binding Rubber Packings to interfere with smooth operation. Easily disassembled for sterilization.

Low In Cost

Boston Record Syringes create sales for the dealer and satisfaction for the user.

Repair exchanges available.
Sizes 1 cc. to 150 cc.

Literature Upon Request

Boston Instrument Mfg. Co., Inc.

50 Thayer St., Boston 18, Mass.

(CLASSIFIED ADS—*continued from p. 40*)

Experienced small animal practitioner, capable of taking full charge, desires position in vicinity of Los Angeles. Interested in partnership, purchase, or lease. Address "Box F 10," c/o JOURNAL of the AVMA.

Veterinarian, experienced, married, draft exempt, desires position with small animal practitioner leading to eventual partnership, or will lease with option to buy. Capable of assuming complete charge of hospital. Address "Box F 11," c/o JOURNAL of the AVMA.

European veterinarian, 18 years in mixed practice in Europe, 1 year in mixed practice in the United States, looking for permanent employment in small animal or mixed practice. Clean, tidy, hard worker, specialized in obstetrics. Not interested in temporary employment. Address "Box F 19," c/o JOURNAL of the AVMA.

Wanted—Practices

WANTED TO BUY—good mixed practice in New England, preferably without equipment or drugs, by veterinarian in Air Force. Available October practice, to be examined this summer. If real estate involved, other than office, house must be adequate for large family and value approximate G.I. loan. Would consider buying partnership with right man or working on salary and percentage with option to buy. Completely experienced and equipped large and small animals. Had own practice for five years before called into Service. Cornell graduate, age 30. Address "Box E 3," c/o JOURNAL of the AVMA.

Remittance must accompany order

Want two-year lease on practice, hospital, and home of veterinarian entering military service. Will not practice within 25 miles of locality after expiration of lease. Income tax returns past three years must show net profit of $10,000 per year or more. Ethical practice only. Rent must be reasonable in consideration of agreement to cease practice in locality when lease expires. Describe type practice, hospital, equipment, and living quarters in first letter. Will consider partnership if real estate is involved, but no payment on partnership until lease term is over. References exchanged. Address "Box F 14," c/o JOURNAL of the AVMA.

(*Continued on p. 44*)

Radiology
in Small Animal Practice

By Gerry B. Schnelle, V.M.D.
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by Myron Thom, B.S., D.V.M.

Upon receipt of Eight Dollars ($8.00) this enlarged volume will be mailed postpaid anywhere in the U.S.A. Beyond this limit the price is Eight Dollars and Twenty-five Cents ($8.25) in U.S. Funds.

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Save Clients $40.00 per ton
Market 2 to 3 weeks earlier on 75 to 100 lbs. less feed

Vitamineral "A to Z"
Antibiotic Feed Supplement

can be expected to help greatly in . . .

1—Weaning pigs earlier, around 10 lbs. heavier.

2—Increasing daily gains up to 10%.

3—Saving about 20 lbs. feed on each 100 lbs. gain.

4—Marketing pigs 2 to 3 weeks earlier.

5—Saving up to 100 lbs. feed per pig.

6—Reducing the 33-1/3% death loss to 10%, or even less.

7—Improving health by combatting non-specific intestinal diseases.

8—Marketing runts and laggards profitably.

9—Getting more uniform litters, fewer set-backs.

10—Cutting high cost proteins down 33-1/3%.

From creep to market — Vitamineral "A to Z" is a better, faster way to save feed, save labor, save time, and save money where B_{12} and antibiotics are wanted.

100 lb. drums. 25 lb. pails.

Everything in ONE UNIT

Bacitracin, penicillin, terramycin, B_{12}, 5 other vitamins, iodine, 6 sources of calcium and phosphorus, 6 trace minerals—ALL IN ONE UNIT—ready to mix in swine feeds.

Where your clients want to feed B_{12} and antibiotics suggest Vitamineral "A to Z" as the easiest, safest, surest way to provide these activators.

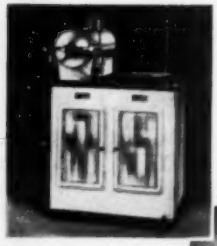
Where antibiotics are not wanted, then the old reliable, dependable Vitamineral Supplements are always available. They have been satisfying swine raisers for 37 years.

Your files are incomplete without literature, feed formulae, and prices on Vitamineral "A to Z", Con-o-mineral, Via-D-Mineral, Viamineral and Viaferm Mineral Supplements.

VITAMINERAL PRODUCTS COMPANY

Peoria 3 (Since 1915) Illinois

SOLD TO VETERINARIANS ONLY



Castle "669"

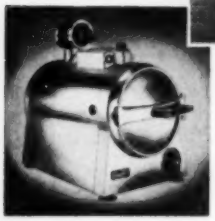
Autoclave—and Boiler

Both fully automatic, *cast in bronze*. Lighted double cabinet. Four glass shelves. Non-rust aluminum base.

Castle "46"

Specialist's Light—

Free-swinging light rotates to *any* position. Off-set arm centers light over table. Adjusts from 4′ to 6′-3″. Cream enamel; brown base. 4 casters.



Castle "777"

Speed-Clave Sterilizer

Fully automatic. Autoclave sterilization of instruments, gloves, dressings in 4 to 8 min. Weighs 15 lbs.

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. . . to make work easier in the small animal hospital

Large hospital or small, Wilmot Castle has a complete line of lights and sterilizers to help your veterinary practice.

Send for free folder on Castle lights and sterilizers . . . and see how they can make work easier in your clinic or hospital.

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Castle LIGHTS AND STERILIZERS

(CLASSIFIED ADS—*continued from p. 42*)

WANTED—good lucrative practice, predominantly large animal, east of the Mississippi. Experienced. Write full details. Address "Box F 9," c/o JOURNAL of the AVMA.

PRACTICE WANTED—dairy cattle or large animal practice wanted on west coast by experienced veterinarian. Licensed in California and Oregon. Address "Box E 18," c/o JOURNAL of the AVMA.

Wanted to Buy

WANTED TO BUY OR LEASE—with option to buy, small animal hospital in city of 50,000 or over. Experienced graduate of approved school. Married, family; draft exempt. Address "Box F 16," c/o JOURNAL of the AVMA.

For Sale or Lease—Practices

FOR SALE OR LEASE—with option to buy. Southern California small animal hospital now at one man capacity. No real estate. Low price lenient terms. Address "Box W 17," c/o JOURNAL of the AVMA.

FOR SALE—new brick hospital in southern state. Winters mild, practice not strenuous. 70% small animals; big future in dairy work. Net $10,000 first year. Very little early morning and night work. $12,500 to handle, balance $150 per month. Address "Box D 7," c/o JOURNAL of the AVMA.

FOR SALE—large animal veterinary practice. Includes new house, garage with attached office, drugs, and instruments. Practice has netted $500 to $600 a month for three years. Total price $11,500, $3,500 cash, balance F.H.A. Address "Box D 16," c/o JOURNAL of the AVMA.

FOR SALE—completely modern, 50-kennel small animal hospital in Rocky Mountain region. Established seven years. Also facilities for large animal hospitalization and surgery. Other interests reason for selling. Address "Box D 21," c/o JOURNAL of the AVMA.

FOR SALE—active mixed practice in northern New England city of 10,000. Grossing $15,000. Includes small animal hospital, instruments, equipment, drugs, and apartment. Price $7,500. Owner entering Service. Address "Box E 8," c/o JOURNAL of the AVMA.

FOR SALE—long-established 60-40 mixed practice in the Southeast grossing $65,000 annually. Beautifully equipped new brick 54-cage hospital with air-conditioned home combined. Will sell real estate and equipment, including x-ray, 2-way radio, autoclave, normal inventory, kennels, for $75,000. Am retiring. Requires two men. Third down and balance monthly at 4%. Will not lease. Address "Box F 5," c/o JOURNAL of the AVMA.

(*Continued on p. 46*)

WHITE'S ANIMAL CASTRATION

A new textbook for TEACHERS, STUDENTS and PRACTITIONERS.

Price $7.50

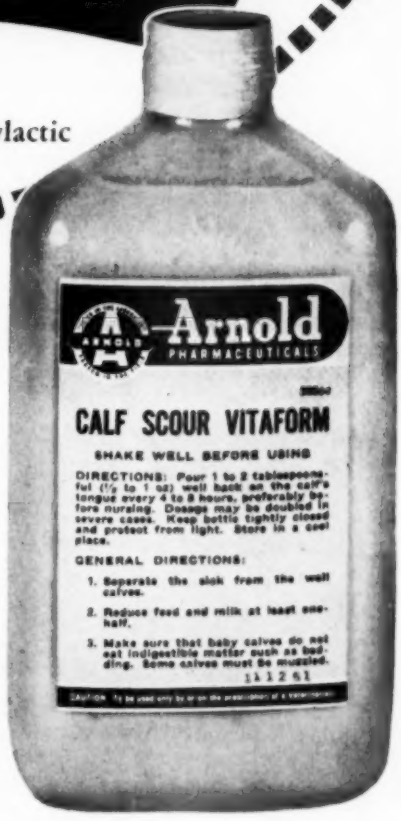
For sale by book dealers, also by the Author, George Ransom White, M.D., D.V.M., P. O. Lock Box 901, Nashville, Tennessee.

Arnold

calf scour vitaform

prevent calf scours

Always a favorite treatment
Now also preferred as a prophylactic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PHARMACEUTICALS
CALF SCOUR VITAFORM
SHAKE WELL BEFORE USING
DIRECTIONS: Pour 1 to 2 tablespoonsful (½ to 1 oz) well back on the calf's tongue every 4 to 8 hours, preferably before nursing. Dosage may be doubled in severe cases. Keep bottle tightly closed and protect from light. Store in a cool place.
GENERAL DIRECTIONS:
1. Separate the sick from the well calves.
2. Reduce feed and milk at least one-half.
3. Make sure that baby calves do not eat indigestible matter such as bedding. Some calves must be muzzled.

It is reported that Diarrhea is the chief cause of baby calf loss up to 10 days of age. To help prevent this loss, prescribe Arnold Calf Scour Vitaform for every calf—from birth through the first few days of its life.

This effective Arnold Pharmaceutical supplies the much needed Vitamin A and D requirements as well as B complex vitamins. In addition, the other ingredients including the new, potent phthalylsulfacetamide, afford a high degree of protection against infection by bacterial invaders commonly causing scours.

Arnold Calf Scour Compound may be administered with the same outstanding effectiveness where high potency vitamin therapy is not required. When too late for prevention, Arnold Calf Sour Vitaform or Calf Scour Compound are still favorites for treatment —with graduate veterinarians everywhere.

	1 Doz.	*3 Doz.*	*12 Doz.*
C.S. Vitaform, 350 cc.			
Low Unit Cost . . .	$ 1.17	$ 1.11	$ 0.98
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C.S. Compound, 350 cc.			
Low Unit Cost . . .	$ 0.67	$ 0.64	$ 0.56
@ . . .	8.00	22.80	80.00

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NEW CASTLE, INDIANA

M·A·C

+ QUICK AND SAFE +

in treating Splints, Spavins, Curbs, Sidebones, Inflamed Tendons, Bursal Lameness, Etc.

Single Bottle....$2.00
3 and 1 free.....5.00
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Advantages of using "M.A.C."

Can be applied in a few seconds.
Only one application in 24 hours.
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DIRECT HEAT ELECTRIC

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QUICK

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NICHOLSON MANUFACTURING, Inc.

Veterinary Supplies

2540 E. 3rd Ave. **Denver 6, Colo.**

(CLASSIFIED ADS—*continued from p. 44*)

FOR SALE— choice small animal hospital fully equipped, lucrative practice in wealthy area southern California; zone protected. $20,000 will handle. Address "Box E 26," c/o JOURNAL of the AVMA.

FOR SALE—hospital, equipment, instruments, drugs, mixed practice, and modern home. Well established, large area, good opportunity. Located in central Wisconsin. Address "Box F 1," c/o JOURNAL of the AVMA.

FOR SALE—due to other business activity, large animal practice with meat inspection job, excellent clientele, located in rich Texas farming area. New large defense plant being built is giving opportunity for small animal practice. Address "Box F 12," c/o JOURNAL of the AVMA.

FOR SALE—beautiful ranch style home with clinic. Mixed practice; expansion unlimited. Southern California resort town. Sell for real estate value. Terms. Address "Box F 13," c/o JOURNAL of the AVMA.

FOR SALE—large animal practice in Middlewest includes house and facilities for small animal work. Net for 1952 was $8,000. Address "Box F 15," c/o JOURNAL of the AVMA.

FOR SALE—small animal hospital in rapidly growing city in Southwest. Will sell for last year's gross. Requires $25,000 down. Address "Box F 21," c/o JOURNAL of the AVMA.

Miscellaneous

FOR SALE—equine mouth speculum, practically new, files, balling gun, other small instruments, single power microscope, wood inlaid glass front instrument display cabinet. Address H. B. Woodward, 2315 Riverside Drive, Santa Ana, Calif.

Dr. Fritz Volkmar, 1929 Irving Park Rd., Chicago 13, Ill., wishes to exchange his veterinary medical bookplate (*ex-libris*) with that of other veterinarians. Correspondence invited.

Dog World magazine, monthly, all breeds. Leads in circulation and advertising. Keeps you informed on current dog affairs. $3, 1 year; $10 for 5 years. Also contact us for any dog book. Judy Publ'g. Co., 3323 Michigan Blvd., Chicago 16, Ill.

(*Continued on p. 54*)

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—repaired in bottom clipper blades. Top and bottom blades sharpened to match. Save money—Guaranteed.
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Sales—Repairing on Oster and Stewart clippers.

Sharpened Blades Tested on Rabbit Fur

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Prompt Service—Est. 17 years

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"Results are from good to excellent without undesirable side reactions."[1]

Many hopeless cases have responded amazingly to treatment with Physotropin. Acting as a cholinesterase inhibitor, Physotropin relieves pain due to muscle spasm. It has been reported[2] as being used successfully in the following conditions: rheumatoid arthritis, inflammation of spinal cord, intervertebral and cervical disc injury, atrophy of muscles following injury, myositis, ventricular dropsy, and as routine following fracture repairs.

Used in solution for immediate results and in tablet form as a maintenance dose. Try it in the next case where it is applicable.

1. Fairchild, S. A. and DeCamp, D., Vet. Med., November 1950. 2. Ibid.

Tablet containing:
Physostigmine Salicylate 0.5 mg (1/120 gr.)
Atropine Sulfate 0.15 mg (1/400 gr.)
Sterile, isotonic solution containing:
Physostigmine Salicylate 1.0 mg per cc.
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SUPPLIED:
Physotropin Solution;
10 cc. Rub-R-Top Vials.
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100's, 500's and 1000's.

Write for samples and literature

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Sanitary, Escape-Proof Design and ALL-STEEL Construction

Yes, from every standpoint, here's the ideal cage. SANITARY, and easy to keep that way. Just withdraw the removable floor panels to clean it out in a jiffy. ESCAPE-PROOF, absolutely. Dogs positively cannot dislodge the sturdy slide bolts, provided on each door. ADAPTABLE — to dogs of every size, since both central partitions and floor panels are removable at will, to make 1, 2, 3 or 4 compartments. Durable aluminum paint finish. Endorsed by prominent Veterinarians. (Testimonials on file; copies on request.)

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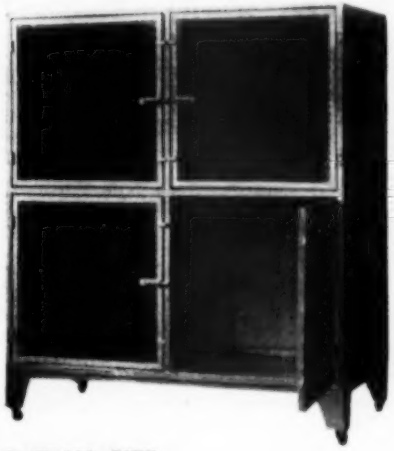
for easy moving from place to place

$160.00 *F.O.B., Providence, R. I.*
Shipped ready to assemble

ORDER NOW for prompt delivery



OVERALL SIZE

Height 68½"	Each of the Four
Width 60"	Compartments is
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CAT CAGES, TOO! Write for details.

FRED W. MORSE CO.
309 SOUTH MAIN ST.
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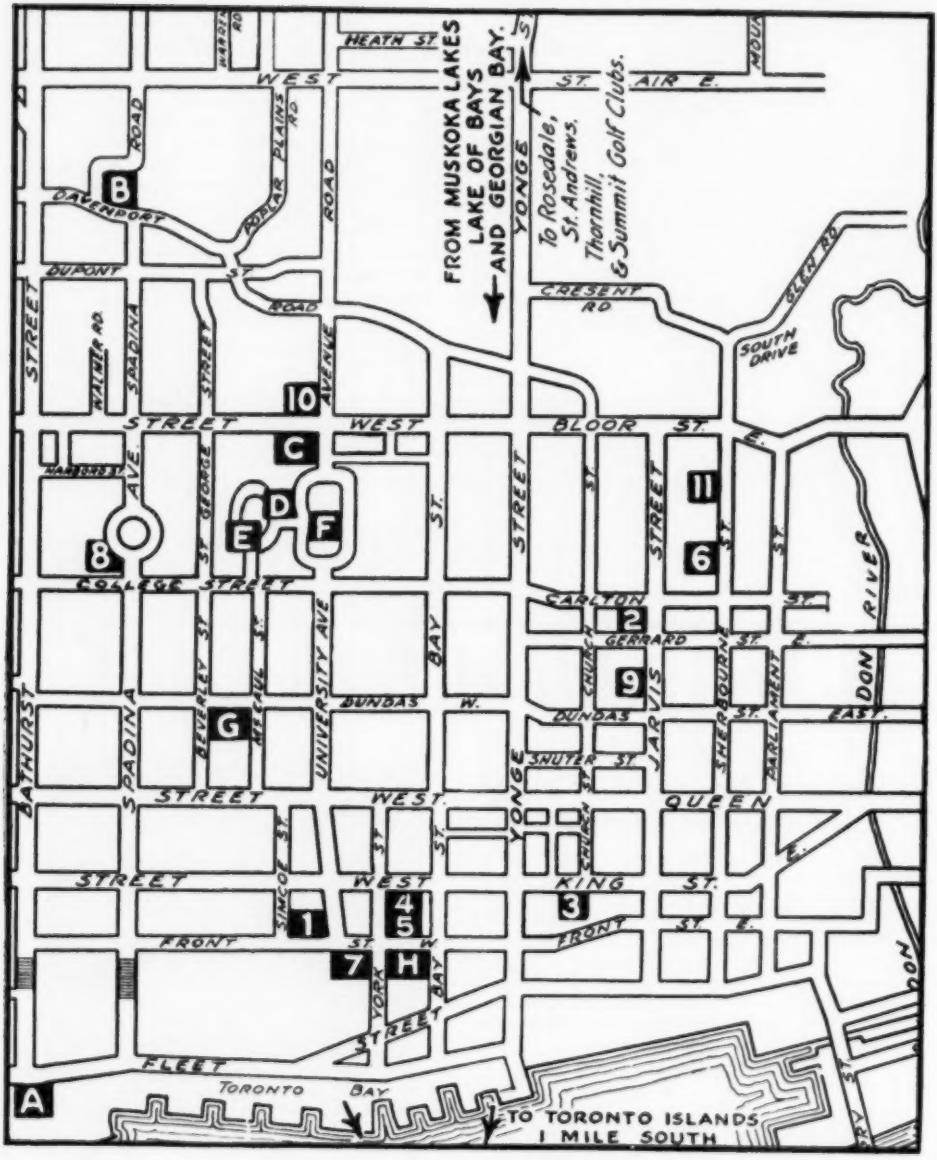

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Ninetieth Annual AVMA Meeting, July 20-23, 1953

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1. The Barclay	$4.50 up	$6.00-8.00 up	$7.50-8.50 up
2. Frontenac Arms	$6.00	$8.00	$8.00 up
3. King Edward	$5.50 up	$9.50 up	$10.25 up
4. Prince George	$4.50 up	$6.50 up	$6.50 up
5. Royal York	$7.50 up	$11.50 up	$11.50 up
6. St. Regis	$5.50-6.00	$7.50 & 8.50	$8.50 up
7. Walker House	$4.00	$7.00	$7.00
8. Waverley	$3.50 up	$6.50-7.50	$7.00
9. Westminster	$5.00 up	$6.00 up	$6.00 up
10. Park Plaza	$7.00-9.00		$10.00
11. Selby	$3.50	$5.00-6.00	

Motor Hotels (Motels)

	Single	Double
12. The Guild Inn (5 mi. east of Toronto)	$6.50	$9.00
13. Alda Motel (about 10 mi. east of Toronto)		$7.00
14. Lido Motel (about 10 mi. east of Toronto)		$8.00
15. Sunnyside Motor Hotel (Lake Shore Rd. at western entrance to Toronto)		$9.00

Cut Off Here

HOTEL RESERVATION FORM — AVMA CONVENTION

To: Housing Bureau, Toronto Convention & Tourist Assn., 30 Bloor Street, West, Toronto 5, Ontario

Date .....

Please make reservations indicated below:

(Three Choices MUST Be Shown)

First choice hotel .....

Second choice hotel .....

Third choice hotel .....

Accommodations and Rates Per Day Desired:

☐ Single room at $ .....

☐ Double-bed room at $ .....

☐ Twin-bed room at $ .....

☐ Suite* at .....

Arriving on (date) ..... at ..... a.m. ..... p.m.

Leaving on (date) ..... at ..... a.m. ..... p.m.

Room will be occupied by (attach list of additional names if necessary). *Do not make reservations for others without prior arrangements with them.*

Name ..... City and State or Province .....

Name ..... City and State or Province .....

Your Name (print or type) .....

Street Address .....

City ..... State or Province .....

*Those desiring suites of rooms should send the Housing Bureau complete information as to accommodations and rates desired.

Sold only to Graduate Veterinarians

FUNGASARC

for the effective treatment of skin conditions

Destroys fungi; sarcoptes scabei canis; demodex canis; mites; fleas; lice. Repels ticks. Non Staining; not greasy; has no objectionable odor, destroys odors of external origin. Non Toxic; may be used daily in recommended dilution. Concentrated; one gallon makes four.

Gallon	Quart
$13.95	$4.00
Makes 4 gallons	Makes a gallon

Available nationally through well known Distributors

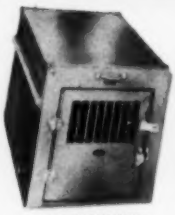
Osco Chemical Company, Inc.

P.O. Box 2157, Atlanta 1, Georgia

"The Genuine" **THE BEST BUY**

THE ONLY PLYWOOD CRATES which need no waterproofing and have METAL LINED DOORS & ALUMINUM TRIM EDGES. The ONLY ALUMINUM CRATES which have NO CAST ALUMINUM DOOR GRILL — THE ONLY CRATES WITH THE ALUMINUM ANGLE TRIM WHICH WILL NOT BEND OR RUST. FREE LETTERING ON ALL CRATES.

IMMEDIATE DELIVERY
100 IN STOCK



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INDOOR KENNEL

3 Compartment Kennels $169.50

Water-proof, sheets heavily galvanized, steel. 1½" angle steel welded frames. Doors—9 ga. 1½" steel mesh with steel tubular frame. Assembled complete. 5' 6" high. 6 ft. long, 6 in. off ground. Painted—175 in stock.

Compare before you buy and you will agree that our kennel is excellently constructed, more costlier materials used, cheaper in price and you actually save from $25.00 to $75.00 for the same kennel constructed elsewhere. Each compartment has drain gutter, no standing water. All floors are flush for easy cleaning. Over 3,000 satisfied customers.

Write for circular on crates

DEE-CHICAGO MFG. CO

Mfrs. of Dog Crates, Equip. & Supplies Since 1912
7600 S. Campbell Ave., WE 7-3300, Chicago 29, Ill.

Correspondence

Feb. 10, 1953

Dear Dr. Hardenbergh:

We thought you might be interested to know that our Girl Scouts earned 19,107 Cat and Dog Badges and 4,764 First Aid to Animals Badges in 1952. We know that many of the Cat and Dog Badges were done with the help of local veterinarians. *All* First Aid to Animals Badges have to be done under the supervision of a veterinarian. We are deeply grateful to your members who have helped us.

Sincerely,
Marie E. Gaudette, *Nature Adviser, Program Development Division Girl Scouts of the U. S. A.*

• • •

Gentlemen*:

We noticed in a recent issue of a journal published by a pharmaceutical company an article entitled "Dispensing in Practice—the Answer to 'Open Market' Competition," which was written by a student of veterinary medicine in your school.

We, as a committee, are charged with the responsibility of conducting an educational program regarding ethical standards of conduct among members of our profession. We, therefore, take the liberty of offering our opinion on this subject.

Remember, veterinary medicine is a profession and not a business. There are those who would lead us to believe we are semiprofessional and semicommercial. When we became members of a profession, we inherited certain responsibilities and not a long list of privileges. It has been said that a professional man has "nothing to sell but his services."

As a committee, we know that the dispensing of professional products is essential and necessary in the successful practice of veterinary medicine. Dispensing consists of supplying a client with medical preparations as are indicated, AFTER AN EXAMINATION has been made of a patient and a diagnosis or tentative diagnosis has been established.

It is not the purpose of veterinary medicine or any medical profession to sell medical products. However, there are borderline cases where it would be difficult to interpret the transaction taking place as purely dispensing, and yet these particular cases could well be included in the realm of ethical professional practice. We refer to the dispensing or sale of such items as wound dressings, fly repellants, and disinfectants. These cases do not need a professional diagnosis by a doctor; and cases arise in which the value of the animal, the financial position of the owner, and the distance involved will not permit the veterinarian to visit the patient. Here the veterinarian must de-

*A condensation of a letter written to a student publication by the AVMA Committee on Ethics.

only RU-ZYME gives you guaranteed

Dual Action!

1. RU-ZYME's high rumen bacteria content gives unequalled results in re-seeding the rumen. Eliminates need for old-fashioned, messy rumen transfers.
2. RU-ZYME also contains potent enzyme cultures* which help to digest starches and cellulose.

PRICED FOR ROUTINE USE AND DISPENSING

RU-ZYME is available from your distributor, or you may write direct. *Buy it by the case.*

RU-ZYME is guaranteed to contain not less than *two billion preserved viable anaerobic bacteria from rumen* culture per gram. It provides an easy and *natural* way to fortify the rumen.

RU-ZYME is packaged in safety sealed glass jars — twelve 75-gram jars per case.

RU-ZYME is represented solely as a natural dietary supplement.

* U. S. Patent Pending.

RUMELK COMPANY, INC. • Salem, Virginia

(CORRESPONDENCE—*continued from p.* 50)

cide the best course to follow. He should use discretion in making final judgment. These borderline cases permit the doctor an opportunity to place his professional talents where they will do good for an unfortunate ailing animal. In many instances this will be without recompense. It will show that veterinary medicine is a sincere professional calling and not a commercial business.

You mention: "Today there are many farmers and herd owners who by-pass the veterinarian and secure all their veterinary needs, including advice, from the local drug store or feed store." A certain amount of this home remedy and treatment service will always exist. You know that it exists in the field of human medicine; veterinary medicine has no monopoly on it.

Perhaps we may learn a lesson from our colleagues in human medicine. As you know, some practitioners of human medicine dispense, but they do not go "all out" for the "selling" of medical and nonmedical products because people continue to go to the corner drug store to purchase one of many proprietary drugs. In the same vein, neither should veterinarians be led into selling their professional standing. We are not in competition with anyone.

Good professional veterinary service is all we have to sell. It is the reason we studied and you are studying to be a veterinarian. Service is all one has to sell to be successful in the practice of veterinary medicine and professional dispensing is a part of practicing veterinary medicine. It is the laymen's prerogative to "buy" wherever they please but if they are interested in purchasing veterinary medical services, it is up to us, as members of the profession, to educate them to the fact that they can purchase such services only from a veterinarian.

Promiscuous selling and over-the-counter diagnoses will never replace the professional diagnosis and treatment by the veterinarian.

Opportunities come every day to the veterinary practitioner to serve the public in a professional manner. This is the purpose for which we went to veterinary medical schools. It is our privilege to serve—yes, the animal owners in the entire field of animal disease.

Sincerely yours,
AVMA COMMITTEE ON ETHICS
s/ Raymond C. Snyder, V. M. D.
Secretary.

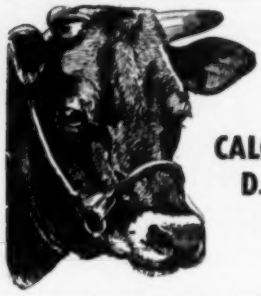
• • • Jan. 27, 1953

Dr. C. D. Van Houweling
American Veterinary Medical Association
Chicago 5, Ill.

Dear Don:

When you wrote to me about our new hospital a month ago I was recovering from a fractured vertebra, and am just now getting back into the swing of things.

I would like to submit an article on our hospital for publication in the JOURNAL, but, Don, an article on the same building was published last April by Drs. Albrecht and Marsh of Princeton, Ill. Dr. Perkins and I had plans prepared for a



CALCINATE
D. . .
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P. . .

The superior parenteral solution of Calcium 1.74%, Magnesium 0.3% and Phosphorus 0.75% as compounds closely resembling those occurring in the animal body, with 25% Dextrose. Especially valuable for rapid replenishment of nutritive elements to devitalized tissues.
Contains *no* chloride or sulfate ions. A favorite with many practitioners as supportive in complications as well as "downers" exhibiting the milk-fever-acetonemia syndrome.

250cc: 6 .... 3.15 doz. .... 7.00 4 doz. 27.00
500 cc: 6 ..... 4.75 dozen 9.20
2 doz. .... 18.00 6 doz. .... 52.40 gross 99.50

CURTS-FOLSE LABORATORIES
Select Pharmaceuticals for the Veterinary Profession since 1918
73 Central Avenue Kansas City, Kansas

Kennel Cage Units

of Wire Mesh and Metal

IN TWO TIERS: 4, 6, and 8 cage units
IN THREE TIERS: 6, 9, and 12 cage units
Sanitary, durable, and easily maintained; galvanized materials; removable pans; hand woven wire mesh doors, maximum light and ventilation; sized for dogs and cats; removable partitions; shipped crated; easily assembled.

THE EIGHT CAGE UNIT
manufacturers
EAST RIVER WIRE WORKS
39-40 Twenty-first St., Long Is. City 1, N.Y.

(CORRESPONDENCE—*continued from p. 51*)

hospital and were getting estimates at the time this article was published last spring. Their floor plan was similar, so I decided to see their building. After seeing it, I decided that we could not do any better and, with their permission, used their complete plans with some minor variations.

We moved into the hospital just after the first of the year, and held an open house on January 17, the 78th birthday of my father who is still nominally in partnership with us.

We have been following the series on hospitals with great interest, and from each article we have received some good ideas to incorporate into our plans. If we can help in any other way please let us know.

Yours Truly,
s/W. J. Kilpatrick,
Mediapolis, Iowa.

Dr. York on Pitman-Moore Staff

The appointment of Dr. C. J. York (Ohio '48) to the research staff of the Pitman-Moore Company has been announced by K. F. Valentine, president. A native of California, Dr. York came to the division of Allied Laboratories from Cornell University where he was awarded his Ph.D. in virology in 1950, which work was done as an AVMA research fellow.

Dr. York's work at Cornell involved isolating and characterizing the causative agents of virus diseases in domestic animals, and in the process of which work he discovered a new virus disease in calves not previously described. He also discovered a new test for leptospirosis in cattle and has developed a new vaccine for the disease.

Harry Miller Addresses "Oldtimers"

Mr. Harry Miller, director of Gaines Dog Research Center, and editor of the *Progress Bulletin of Dog Research*, spoke to the Oldtimers of the Kennel World, which limits its membership to those who have been active in the dog fancy in for at least twenty years, at the Henry Hudson Hotel, New York City, on February 8.

REGISTERED **BURDIZZO** TRADE-MARK

BLOODLESS CASTRATOR
ELIMINATES CASTRATION LOSSES — NO INFECTIONS — NO SHRINK — NO SCREW WORM RISKS!
HAVER-GLOVER LABORATORIES, KANSAS CITY, MO.

Sole Makers: LA "BURDIZZO" CO.
Corso Sebastopoli 187—TURIN (Italy)

Dr. Lindow Counsel to Feed Industry

Dr. Carl V. Lindow has resigned as director of research at the Kellogg Company, Battle Creek, Mich., to become scientific counsel to the food

Dr. Carl V. Lindow

and feed industries. His office, library, and laboratory is located at 2550 W. Michigan Ave., Battle Creek. He will conduct an experiment station at his Hamilton Lake Farms, Michigan.

A Grant for Mastitis Research

A grant for medical research in the amount of $2,000 was made to the Michigan State Board of Agriculture by Sharp and Dohme, Inc., according to Dr. Wm. P. Bolger, medical director. Research will be carried on for one year by A. R. Drury, D.V.M., School of Veterinary Medicine, Michigan State College, East Lansing. He will conduct a clinical investigation of the effectiveness of neomycin-penicillin-dihydrostreptomycin ointment, Aramine, and pancreatic dornase in the treatment of bovine mastitis.

The goat that reeks on yonder hill
Has browsed all day on chlorophyll.
—*Veterinary Record.*

TAMM UDDER SUPPORTS

Prevent caking, Bruises, Self sucking, Smashed teats.

Waterproof bag serves as a container for medicinal solutions. Three sizes, *small*, 900-1100 lb. cows; *medium*, 1100-1600 lb. cows; *large*, over 1600 lb. cows.

Price, $17 retail.
Professional discount, 30%.
Write to Dept. V1

FRANKSVILLE SPECIALTY CO.,
Franksville, Wis.

Notice to Contributors

Journal of the AVMA

and the

American Journal of Veterinary Research

Exclusive Publication.—Articles submitted for publication are accepted with the understanding that they are not submitted to other journals.

Manuscripts.—Manuscripts must be typewritten, double-spaced, and the original, not the carbon copy, submitted. One-inch margins should be allowed on the sides, with 2 in. at top and bottom. Articles should be concise and to the point. Short, simple sentences are clearer and more forceful than long, complex ones. Footnotes and bibliographies **also** should be typed **double space** and should be prepared in the following style: name of author, title of article, name of periodical with volume, month (day of month, if weekly), and year.

Illustrations.—Photographs should be furnished in glossy prints, and of a size that will fit into the Journals with a minimum of reduction. Photomicrographs which cannot be reduced should be marked for cropping to 1-column or 2-column width. Drawings should be made clearly and accurately in India ink on white paper. Figures appearing on graphs or charts should be large enough to allow for reduction necessary for the chart or graph to fit on Journal pages. All illustrations should bear the name of the author on the back.

Tables.—Tables should be simple. Complex tables are not conducive to perusal. It is wiser to summarize complex material rather than to attempt to tabulate it.

News.—Secretaries of associations and readers are requested to send us announcements of meetings and news items.

Anonymous Letters.—Anonymous communications, of whatever nature or purpose, to the JOURNAL or to the Association will not be published or referred for consideration to any Association official or committee.

AMERICAN VETERINARY MEDICAL ASSOCIATION
600 So. Michigan Avenue
Chicago 5, Illinois

Mineral Deficiencies?

Recommend STERLING TRACE-MINERAL BLUSALT

THROUGHOUT THE COUNTRY, local feed sometimes lacks essential trace minerals. Where this is true, field reports show that when farm animals are given STERLING Trace-Mineral BLUSALT they produce better, grow bigger faster, bring more profits. Sterling Blusalt provides *vital salt* to aid digestion of protein, carbohydrates and fats *plus* these trace minerals:

Cobalt—essential for Vitamin B_{12}—guards against loss of appetite, permits maximum body gains and helps maintain normal level of hemoglobin in the blood.

Manganese—necessary for successful growth, reproduction, lactation and bone development.

Iodine—to help prevent simple goiter.

Iron—essential as part of hemoglobin to every organ and tissue of the body.

Copper—necessary with iron for hemoglobin formation.

Zinc—growth producing and a part of enzymes.

Recommend that Blusalt be kept before farm animals at all times—and mixed with feed according to directions on the bag.

STERLING
TRACE-MINERAL
BLUSALT

100-lb. bags
50-lb. blocks
4-lb. liks

International Salt Co., Inc.
Scranton, Pa.

(CLASSIFIED ADS—*continued from p. 46*)

BOVINE PROLAPSE PREVENTER—Payton UTERO-VAGINAL Prolapse Preventer. Quickly, easily applied to any size cow. Positive protection. Re-usable, nonirritating, sanitary. Noninterference with placenta release. Excellent for vaginal protrusion; dispensing. See article JOURNAL of the AVMA, December, 1951. Only $2.00 prepaid. Dr. Jerome Payton, Morris, N.Y.

QUESTIONS AND ANSWERS—VETERINARY—a classified grouping of selected questions and answers. Problems perplexed hundreds of veterinarians; 140 authorities answer. Indexed for quick reference. Postpaid $4.00 U.S., elsewhere, $4.25. American Veterinary Publications, Inc., Box 872, Evanston, Ill.

ARTIFICIAL INSEMINATION INSTRUMENTS. Disposable obstetrical sleeves 20c each. Package of 20 including detachable chest band — $5, postpaid. Samples and complete catalog on request. Breeders Equipment Co., Flourtown, Pa.

MEDICAL FIELD OPERATING LAMPS, new portable, run on any current. Wilmot Castle and American Sterilizer. $25.00 FOB Orangeburg. Also nylon rope. Ask for catalog. Sailors Surplus. Orangeburg 19, N.Y.

GIVE YOUR CAT PATIENTS A BREAK! Put *Cats* magazine on your waiting room table. It will help you, too, to keep up to date on what's happening to cats all over the United States and Canada. $5.50 for two years, $3.00 for one. CATS, 1144 House Bldg., Pittsburgh 22, Pa.

Clipper Blade Sharpening

Have your Clipper Blades sharpened by an expert with 28 years of practical factory training. We know how your blades must be ground to cut like new. Also clipper repairing. All work guaranteed to satisfy you or money back. Now serving veterinary colleges, and over 500 satisfied veterinarians. Why not you? 24-hour service. We ship insured prepaid. Avoid C.O.D. charges; enclose 75c for each set with blades. We are headquarters for Sunbeam Stewart labor-saving equipment, Allover, and Oster quality clippers and blades. Write for information on Oster, Stewart, and Allover quality clippers and products. Service Grinding and Supply Co., 903 Chicago St., Racine, Wis.

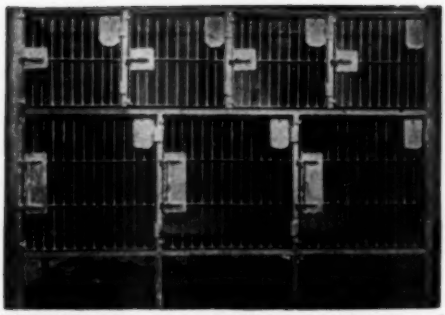
Received Too Late to Classify

PRACTICE WANTED—busy mixed practice in Pacific Northwest by experienced married veterinarian. Address "Box F 22," c/o JOURNAL of the AVMA.

June graduate, AVMA-approved school, own car and equipment, artificial insemination experience, desires position, preferably large animal practice. Married. Hard working; congenial. References. Address "Box F 23," c/o JOURNAL of the AVMA.

PRACTICE WANTED—looking for a large animal or mixed practice. Prefer Northeast. Three years' experience in a mixed practice. Married veteran. Address "Box F 24," c/o JOURNAL of the AVMA.

WANTED VETERINARY FIELDMAN—career opening for veterinarian with large progressive dairy products firm. Educational and counseling work on farm sanitation, dairy production, federal and state government regulations. Will do physical examination on dairy cattle. Address "Box F 25," c/o JOURNAL of the AVMA.



RIVERSIDE ALL STEEL KENNELS—QUALITY FIRST

Seven Compartment. Upper tier 22x20x30. Lower tier 28x28x30. Five Compartment. Upper tier 22x20x30. Lower tier 27x31x30. Sliding doors may be installed between openings for extra large cages if desired. MINOR CHANGES IN DESIGN AND EQUIPPED WITH 3-inch ball bearing CASTERS AT NO EXTRA COST. Foolproof latches and identification tags on steel barred doors. Bottom cages have six-inch ventilating strip. Shipment FOB our plant.

Send For
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TERMS MAY BE ARRANGED IF DESIRED

A lifetime of service and guaranteed by one of California's oldest iron works.

RIVERSIDE IRON WORKS
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Provides an accurate pattern against which to cut with knife or razor blade. Fits firmly, cannot move or slip when clamped into position. Made of non-rusting, light, cast aluminum, highly polished. Lasts a lifetime with minimum care. Simplicity of design and construction reduces possibility of breakage or mechanical failure. Forms immediately available to provide distinctive marking of these breeds:

Boxer — postpaid $15.00
Boston Terrier — postpaid $15.00
Great Dane — postpaid $15.00
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Set of above four — postpaid $50.00

These patented "championship" forms are patterned after markings of winners of top honors in show competition. Forms for other breeds made on special order. Sold to veterinarians only. Send check or money order.

MacALLAN LABORATORIES
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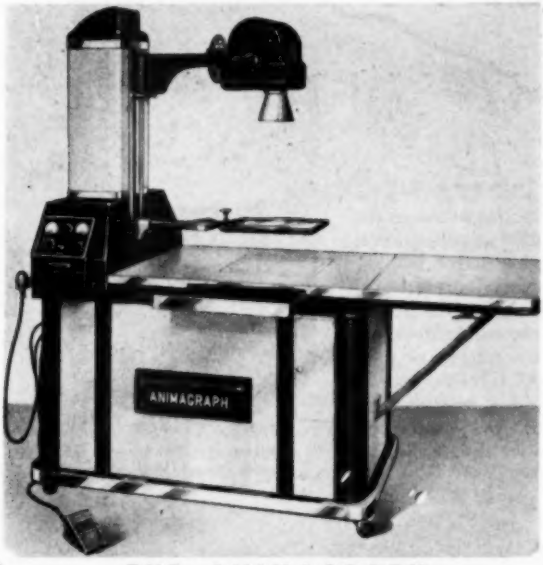

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Write for Prices and Terms. Use This Coupon.

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TRADE MARK REG. U.S. PAT. OFF.
U.S. PAT. NO. 2,323,704 JULY 6, 1943

BEWARE OF IMITATIONS

4 Outfits in **1** Exclusive Veterinary Design

FLUOROSCOPY (motion pictures)
RADIOGRAPHY (still pictures)
THERAPY (for skin treatment)
PORTABLE (large animals outside)

The only complete x-ray machine designed from the ground up for the exclusive use of the veterinarian.

THE BETTER GRADE SMALL ANIMAL HOSPITALS INSTALL ANIMAGRAPHS

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110 Cummington St., Boston 15, Mass.
Kindly send me descriptive information, including prices and terms, on the Campbell X-Ray Animagraph.

Dr. .....
(Please Print)

Address .....

.....
(City and State)

Treatment of FROTHY BLOAT no longer presents a difficult practice problem for the veterinarian. The administration of RUMONAL (with a highly active *Silicone* derivative) promptly increases surface tension and thus dissipates dangerous bloat. It can be used safely and effectively with ruminatoric or peristaltic stimulants. RUMONAL may be injected through the abdominal wall directly into the rumen or administered as a drench.

40 cc. Rumonal represents a full dose for mature cattle or horses: the sheep dose is 5 cc. to 10 cc.

Supplied in:
Carton of 6-125 cc. puncture-seal bottles.

COAST TO COAST SERVICE — **TO GRADUATE VETERINARIANS**

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POTENCY PROTECTED
QUALITY AND UNIFORMITY
UNEQUALED

ANTI-SWINE ERYSIPELAS SERUM

(LOCKHART)

for all discriminating veterinarians who are interested in quality, potency and an unparalleled record of performance in the laboratory and in the field.

Once a user, always a user of Anti-Swine Erysipelas Serum (Lockhart).

Erysipelothrix Rhusiopathiae Vaccine (Lockhart) is available for use in conjunction with thi. quality antiserum to assure immunity, and profits of swine producers.

ASHE LOCKHART, INC.

800 Woodswether Road **Kansas City, Missouri**

Now! Field-proved Tympanol (Jen-Sal) has increased activity in frothy bloat

Five years ago, TYMPANOL introduced an entirely new approach to frothy bloat control. Extensive clinical usage confirms the practical effectiveness of TYMPANOL's polymerized methyl silicone in dissipating frothy bloat.

TYMPANOL's effectiveness has now been increased. Surface tension-increasing activity is stepped up five times, which means that a 50 cc. dose will handle most cases, and a 100 cc. vial supplies maximum antifrothing action for large animals or resistant cases.

Each 100 cc. vial of TYMPANOL (Jen-Sal) now contains 2.5 grams of methyl silicone in a new, free-flowing, quick-diffusing base. Packaged in boxes of twelve, 100 cc. vials.

Administer TYMPANOL with Jen-Sal's special spray-type rumen needle (JS 3621) for best results.

JENSEN-SALSBERY LABORATORIES, INC.
Kansas City, Missouri

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